Vol XLVIII NOVEMBER 29th, 1945

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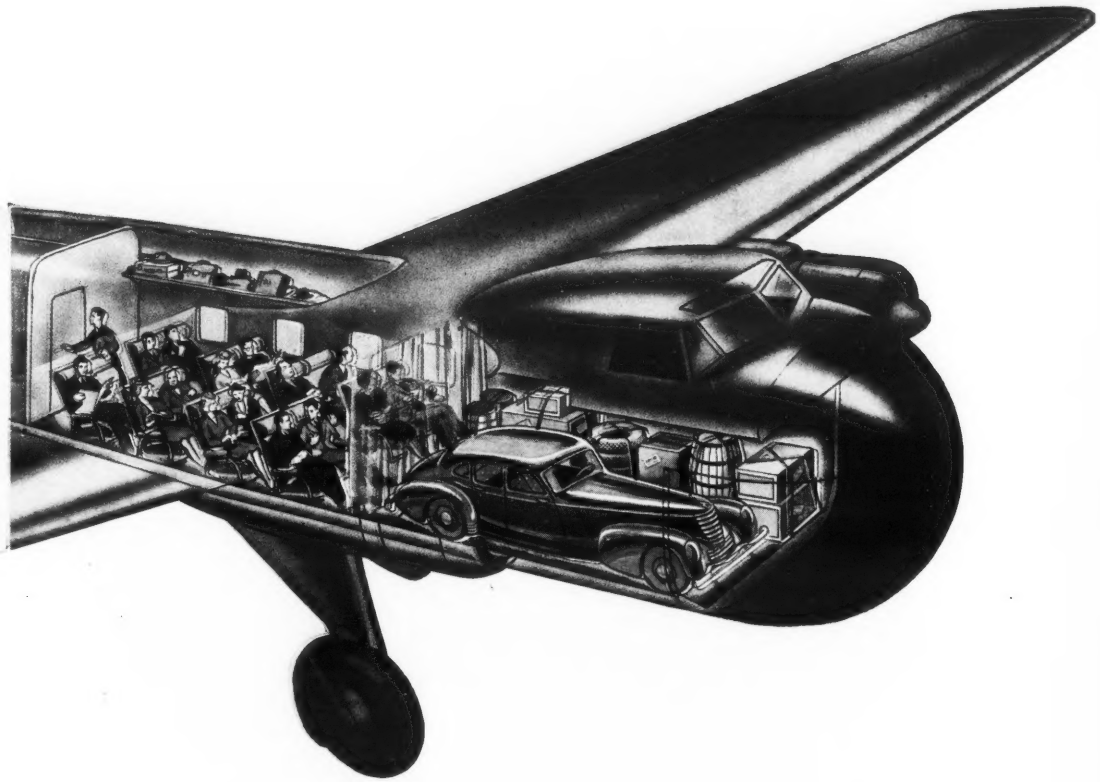

Bristol

THE BRISTOL AEROPLANE COMPANY LIMITED

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Abroad: Year, £3 1 0. 6 months, £1 10 6.

Registered at the G.P.O. as a Newspaper.

No. 1927. Vol. XLVIII. November 29th, 1945 Thursdays, One Shilling.

The Outlook

It Won't Do

TO blame the newspapers for over-publicising air accidents and to attempt to combat such adverse propaganda by quoting fatality figures which are "favourable" in relation to miles flown are tactics too often used in the world of aviation. Let us for once face the fact that the Service air transport accident record of the past few months has been a tragically bad one. The appalling and almost day-to-day fatality record will lower the public's confidence in air travel for years to come.

All the good effects of a hard-won safety record in civil operations are being thrown away by the R.A.F. The most carefully briefed statisticians will not be able to find satisfactory figures to balance the unpleasant fact that the Service has suffered accidents involving a passenger death-rate figure of well over a hundred in ten days of peacetime, non-operational flying.

The individual reasons for the different accidents may be various, but the basic cause is all too obvious. There are quite inevitable differences between the outlook, attitude and even training of Service and civilian flying personnel. The Service attitude is rightly one of disciplined "dash"—but this is quite the worst spirit in which to approach any air transport operation. A high standard of safety can only be maintained by mature individuals who, while appreciating and understanding the dangers which will always be present, know that these can be cancelled out by pluperfect organisation and maintenance, good training and meticulously cautious captaincy.

The record of the past few weeks suggests all too painfully that the whole Service approach to this specialised work of air transport is faulty. There was a time when Transport Command crews were recruited more or less at the whim of the Advanced Flying Units—with the not unnatural result that the most suitable pilots and crews were by no means necessarily chosen. The outcome was that the flying staff tended to consist of a small nucleus of really experienced pilots surrounded by a miscellany of partially trained newcomers.

Whatever the causes of these recent accidents, the situation *must* be improved. We cannot afford to throw away lives and we cannot afford to lose the public's confidence in air travel.

Long-distance Record

IT is somewhat remarkable that just after Britain had recovered one of the great world's air records she should have lost another. There are three air records which are universally considered to stand out above all others in importance, namely, speed, distance and altitude. Britain, thanks to the Meteor, has just recovered the speed record, which she had not held since Agello, in 1933, beat that of Stainforth. Now the long-range record, established by two Vickers Wellesleys in 1938, has passed to the United States.

The new record-maker was, of course, a B29 or Superfortress, which had been designed for long-range bombing of Japan. Once the military equipment had been removed and extra fuel tanks installed, it was only to be expected that this type would exceed the 7,162 miles of the Wellesleys on their flight from Ismailia to Darwin. The jump up to 8,198 miles, on the flight from the Pacific island of Guam to Washington represents a very handsome margin, and the American flight was a very fine feat indeed, and will be sincerely applauded on this side of the Atlantic.

It might be asked what ultimate good purpose is served by long-distance flights, now that the need for long-range bombing appears to be over. In civil air transport it would be wasteful and extravagant to ask an

aircraft to carry such a weight of fuel instead of a paying load. Shorter stages and periodic refuelling is the obvious plan for the future. It is by no means certain that the days of long-range bombing are over, although it may well take a different form. One may imagine, for instance, that to get the necessary accuracy over really long distances, a rocket-propelled projectile will have to be carried part of the way by aircraft and launched from it when within a range which will give the desired accuracy. For such distant targets the long-range type of aircraft capable of carrying a considerable load may still have a very useful function to fulfil.

German Research

MUCH has been spoken and written about German projects and achievements in the aeronautical field. There is, however, one aspect which appears to have escaped general notice, and yet it is one which may be of considerable importance to future British development. It is dealt with at some length in this issue by Sir Roy Fedden, who led a British mission to Germany some months ago, and who has now had time to ponder the vast quantity of material which that mission collected.

Sir Roy, after examining the pros and cons, comes to the general conclusion that to dismantle, transfer and re-erect German research equipment in this country would be impracticable for us, although this procedure has been followed on a considerable scale by Russia and America. With that argument few who appreciate the difficulties would quarrel. The alternative is not very attractive either. It is to leave German research workers in their own country to elucidate to our representatives, under strict supervision, what was in their minds when the work was begun, the results obtained, and the conclusions reached as to the next line of development to be followed.

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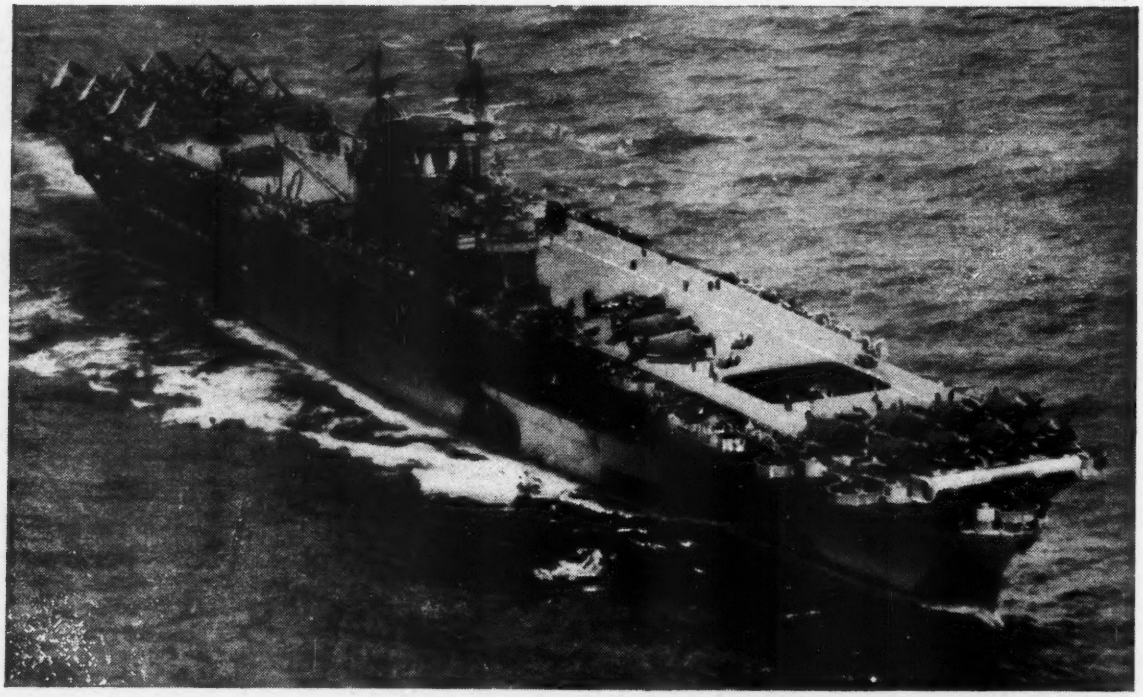
The difficulties are obvious, but Great Britain appears to have "missed the boat" during the period immediately following Germany's collapse, and Sir Roy's second alternative may well prove to be the only way in which this country can extract a measure of scientific information from the remnants of German research establishments and their scientists. One great merit of this policy would be that much precious time would be saved. As Sir Roy rightly states, deprived of his equipment the scientist generally shrivels and dies, mentally. By putting him to work under our direction we should ensure that he was kept mentally alive, and the task of putting the experimental equipment into working order would be small compared with that of dismantling it and re-erecting it here. And judging by the rate at which our dwelling houses are not being built, the German scientist's brain might well have become "Hessified" by the time the wind tunnels, etc., were in working order here. We should look rather silly if an elaborate piece of research equipment were assembled in this country and then it was found that the German scientist's mind was a blank on the subject.



FIGHTING LADY: The American aircraft carrier U.S.S. *Enterprise* which is now privileged to fly the British Board of Admiralty Flag in recognition of her exploits. The presentation, which took place in Southampton Docks, is reported on page 587.

Red Herrings for Luftwaffe

Another War Secret Disclosed : How Airfields, Factories and Even Cities Were Protected by a Country-wide System of Decoys

OF all the wartime secrets which have been disclosed to the public since the end of hostilities—the "official" end, that is—probably none had such wide application as the decoy system of protection against German air raids. Obviously, it was not possible to preserve complete secrecy with dummy airfields, factories, and other decoy equipment scattered all over the country, but the fact that a very large measure of secrecy was maintained speaks volumes for the integrity and good sense of the many thousands of Britons who must necessarily have known about them. And even when the *Luftwaffe* did finally tumble to the dodge, it still worked reasonably well because it was so cleverly applied. For example, the dummy target was always located quite near the real target so that the two could not be differentiated by mere navigation, and the dummies were cunningly devised to look, from the air, as though an attempt had been made to camouflage them.

It began at the start of the war, when the Air Staff established a special branch to develop a technique of decoy protection to draw off attacks made on R.A.F. airfields and stations by day and night. It was, of course, realised from the first that the big pre-war R.A.F. stations with their concentrations of large buildings and constant movement of aircraft and ground transport could not be simulated by any practical form of decoy. But even at that early date there were a fair number of smaller satellite airfields, with few buildings or made roads, which it was possible to copy very effectively, and during the period of maximum daytime attack in 1940 and early 1941 these dummy satellites drew off 36 attacks.

It Could Not Last

Later on, when the real satellites expanded and acquired long runways and camps, it was realised that the enemy was soon bound to recognise the dummies for what they were. This expectation was duly confirmed when an enemy reconnaissance aircraft was shot down and in it was found a map with a number of the dummy airfields marked as such. That was the end of their usefulness, so they were closed down.

About the same time as the dummy airfields were functioning—in 1940—it was also decided to apply the same kind of protection to some of our all-too-few aircraft production centres, and four dummy factories were constructed adjacent to four of the genuine article. These dummy production plants were complete with parks of (derelict) cars, dummy roads, real smoke from dummy chimneys, and all the other necessary trimmings, including dummy aircraft on the alleged tarmac. These also worked fairly well and drew upon themselves nine day attacks and 14 night raids.

Decoy airfields at night were a much easier and simpler proposition because it was only necessary to reproduce the lighting used on the real ones, and keep it up to date. Ordinary farmland or other open country could be used, because the lights were carried on poles and the nature of the ground did not matter; it did not even have to be level. In fact, the less it looked like an airfield in the daytime the better, for that minimised the chances of its presence being detected. Cables leading to the lights were, of course, buried—in the case of arable land, below ploughing depth.

There was one obvious snag with these night decoy airfields, however, that had to be guarded against. That was the risk of any of our own aircraft being led astray and trying to land on them. This was avoided by having certain small differences in the lighting which could only be recognised by our own and Allied pilots, who were regularly briefed in this important matter.

During the month of June, 1940, no fewer than 36 attacks were wasted on the 40 decoy night airfields in operation by that time.

As more and more real airfields were constructed, the number of decoys also increased, until there were 200 of them dotted about the country. This proved to be the saturation limit, for by this time the country was so crowded with airfields, factories, depots, training grounds, and so forth that no more safe sites were left for further decoys.

Lives and Property Saved

By this time, of course, the *Luftwaffe* was well aware that it was being offered almost as many decoy targets as those it was really seeking, but the Hun was able to do so little about it that, by the end of June, 1941, he had thrown away his bombs in 322 night attacks on the dummies as compared with 304 on genuine airfields. It is fairly certain, however, that by no means all of those 322 attacks on decoy lighting systems had been really meant for R.A.F. airfields. Many of them had been carried out by enemy aircraft seeking civil targets, and so the dummy night airfields gave considerable protection to the civilian population, and undoubtedly saved many thousands of British lives as well as valuable property.

Realisation of this was, no doubt, largely responsible for the recommendation to the Air Ministry by the Civil Defence Committee that similar protection should be provided for civil targets and built-up areas, and this resulted, first of all, in the Air Ministry taking over responsibility for the co-ordination of all decoys at night in order to prevent overlapping and, very likely, mutual interference. Patently one could not set up a dummy town cheek-by-jowl with every populated centre, but an air reconnaissance was made of the various forms of civil lighting used at night —railway yards, for instance, had to be permitted a certain amount of light to work by—and experiments were made with a few decoy types to imitate them. Then came the Coventry blitz and Hitler's amiable threat to "rub out" all our cities in turn. This altered the picture completely, because decoy lighting could do little to draw off such massed attacks, and once a fire or two had been started in a large town, the enemy could see for himself that he was "bang on" the real target. The answer was pretty obvious. The enemy used fires as a target marker; then we'd provide them for him—but outside the borough boundary!

"Starfish"

Thus an elaborate system of decoy fires which could be electrically ignited was installed as quickly as possible wherever considered practicable. Swift experiment showed that by using three different types of inflammable material it was possible to imitate a town fire quite faithfully, and these decoy fires were known by the code name of "Starfish." Again the ruse worked very well indeed, and by the end of the war no fewer than 100 attacks on big industrial and civil targets had been drawn off by the Starfish installations. Incidentally, civil decoy lighting to imitate ship and railway yards, factories, coke-ovens and so forth were still used, and some of these were actually on Starfish sites and so made the deception all the more perfect.

The degree of success of the Starfish decoys, as might be expected, varied inversely with the size of the target. London and Birmingham decoys achieved a number of successes, but the proportion of the whole attack drawn off was much greater in the case of Bristol, which was

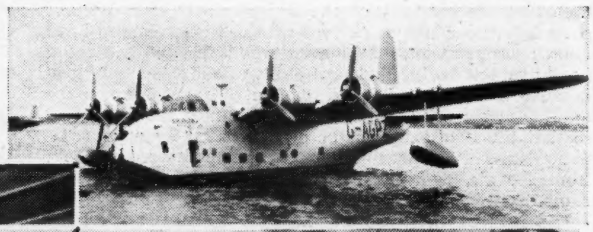
RED HERRINGS FOR LUFTWAFFE

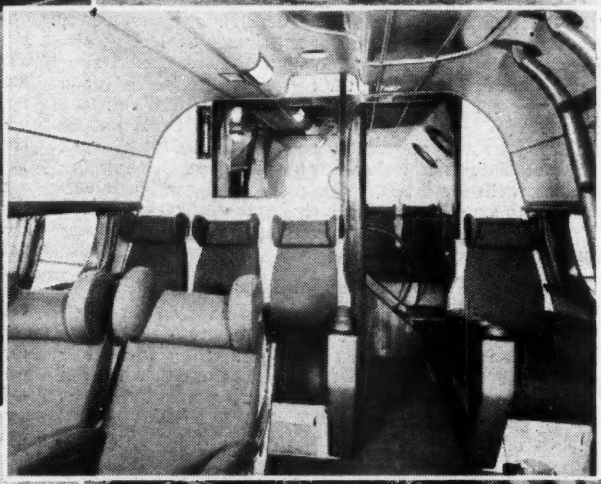
spared many hundreds of bombs intended for it. Cardiff's Starfish drew off 150 bombs in one night, and the Navy's decoys were particularly successful at Plymouth, Portsmouth and on the Humber. Middlesbrough was another example of Starfish success, and it is of passing interest, in this case, that it was operated by the civilian staff of the vast I.C.I. works. Good black-out discipline and the efficiency with which the local N.F.S. put out any fires in the real target area were other vital factors in the degree of success achieved by the Starfish.

Finding suitable sites for decoys was not easy. Undue risk to isolated houses, farms and small villages had to be avoided, and also undue interference with agriculture. A special department of the Home Office had to be set up to see that decoys were not sited on land wanted for new factories or other vital purposes. Farmers and other rural people, on many of whom decoy crews were billeted, must have known what it all meant, yet there were few complaints and almost no "leakage of information." Immediate compensation was paid if cattle or sheep were killed, and it is remarkably satisfactory that in a total of 730 recorded attacks on decoys, there were only four cases where casualties occurred to people living in the neighbourhood.

"CIVILISED" SUNDERLAND

Argentina, the first of the four civil-version Short Sunderlands ordered by the Dodero shipping line, left for Buenos Aires last week with Senor Dodero and eleven other passengers. The engines are 1,250 h.p. Pratt and Whitney Twin Wasps but the most noticeable external difference is the 'Sandringham"-type nose.





Under the exterior view of *Argentina* is seen the top deck, looking aft. Furnished as a cocktail lounge in light blue and cream, it has 17 seats with folding tables. At the top of the stairs is (top left) a mahogany-finished cocktail bar. The lower deck seats 28, in four compartments, one of which is seen in the bottom left photograph. (Bottom right) : On the flight deck. Standing is Capt. Dudley Travers, D.F.C., of B.O.A.C., and with him is the 2nd pilot and navigator, Wing Cdr. N. B. Littlejohn, O.B.E. They are wearing the Dodero Company's uniform. Mr. Geoffrey Tyson, Short Bros.' chief test pilot, was also on the trip. Natal, 4,590 miles on the 7,330-mile route, was reached in 25½ hours flying time.

HERE AND THERE

Scottish war correspondents inspect an Arado Ar 234 on an airfield when a party of them visited the R.A.F. at Stavanger shortly after a Disarmament Wing had taken over the station following the German surrender in Norway.

Thunderbolts, Indeed!

AN amusing little slip of the tongue was made by the B.B.C.'s chief announcer, Stuart Hibberd, one night last week when he was reading the 9 o'clock news.

Dealing with the R.A.F.'s part in the Indonesian trouble in Java, he said that their Thunderbolts were dropping 500-ton bombs!

Even the American Press has never made such claims for this excellent fighter-bomber.

New R.Ae.C. Secretary

THE committee of the Royal Aero Club has selected Col. R. L. Preston, C.B.E., for the post of secretary in succession to Mr. Harold Perrin, who retires on December 31st after being secretary for more than 44 years.

Col. Preston (affectionately known as "Mossy") is known to almost everyone in British aviation, having served on the R.Ae.C. committee and on many of the sub-committees, and having always taken a keen interest in club and private flying. Mr. B. Stevenson will continue as house secretary.

Bombers Into Bungalows

"BEATING bombers into bungalows is the modern version of turning swords into ploughshares," observed Mr. Arthur Woodburn, Parliamentary Secretary to the Ministry or Aircraft Production, when he opened Blackpool's first aluminium house last week.

Adding that the aluminium houses now being turned out by five great British factories which formerly produced bombers were "recognised as the world's finest 'prefabs,'" Mr. Woodburn said that 50,000 of these bungalows would be produced in the next year or two from thousands of tons of aluminium scrap recovered from obsolete aircraft. The type was ideal for newlyweds or ageing couples

That 1,000 km./hr. Target

FLEET STREET newshounds have being trying, it would appear, to pin down Mr. F. McKenna, general manager of the Gloster Aircraft Co., to a definite statement on whether the Meteor will, or will not, go out for the trophy offered by M. Bleriot for the first to reach 1,000 km./hr. (621 m.p.h.), in an official world's record.

But Mr. McKenna was not to be so easily drawn and replied with Asquithian caution, "We shall have to wait and see." He added, however, that he had no doubts whatever about the Meteor's capabilities in that direction.

Air Comdre. Frank Whittle was equally confident, and is reported as saying to a Press Association reporter, "You can take it from me that the Meteor can do it."

Avro Canadian Factory

IT is announced that A. V. Roe and Co., Ltd., have purchased from the Canadian Government the Malton, Ontario plant of Victory Aircraft, Ltd., established during the war to build Lancasters.

There will be an exchange of designers between the Manchester and Canadian factories to accelerate the development programme for the Tudor II and other Avro types, and the company has also undertaken the development of gas turbines for aircraft and other purposes.

The formation of the entirely reorganised company's board has not yet been completed, but Sir Roy Dobson is to be its president, Mr. J. P. Bickell, the Canadian who was entrusted with the formation of Atfero early in the war, will be chairman, and Mr. Walter Deisher, formerly with the Fleet Aircraft Corp., will be vice-chairman and general manager. Mr. T. O. M. Sopwith and Mr. John Tory, K.C., a Toronto barrister, will be members of the board.

"Now- stop sharpening pencils on these new- airfoils!"

The Last Hundred

AIR VICE-MARSHAL JOHN H. BORET told a Press conference in Oslo last week that only 100 British airmen now remained in Norway.

Fifty-three thousand German air force personnel had been repatriated, he said, which left just over 3,000 more to be repatriated.

The radar station at Stavanger, one of the finest in the world, had also been handed over to the Norwegians.

Mobile Steel Works

ELSEWHERE in this issue is an account of the decoy protection system which operated in Britain during the war and which resulted in much of the *Luftwaffe's* effort in air raids being wasted on dummy targets.

Another sidelight on measures to defeat the night raiders was mentioned last week by Sir Walter Benton Jones, chairman of the United Steel Companies, Ltd., at the annual meeting in London.

Various methods were adopted by steel works to prevent the glow of white-hot slag from giving away the exact position of the plant, but the most original one was at Appleton, where they solved the problem by constructing mobile buildings mounted on wheels on parallel sets of lines Every night these buildings were moved over different pits, each taking 700 tons of slag, which was excavated when there was no danger.

Trade Follows the Roundels

THE closing down of wartime R.A.F. stations in various parts of the country invariably means a financial loss to tradespeople in the nearby towns or villages. Wigtown, Scotland, is a recent case in point.

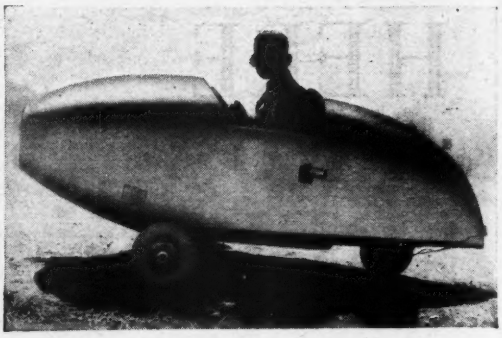
It has been estimated that the personnel on this station spent upwards of £250,000 a year in the surrounding neighbourhood, and now that the

HERE AND THERE

station is being reduced to a care and maintenance basis, this source of revenue to the local inhabitants of Wigtownshire will disappear.

The station was opened in the summer of 1941 and many thousands of pilots and aircrew—British, Dominion and Allied—have passed through it.

It was at Wigtown, too, that the first mountain rescue party in Scotland was established under an emergency rescue scheme.



A BASE USE: This tiny three-wheeler, built by a reader of *The Motor Cycle* from a Mosquito drop tank and powered by a 98c.c. two-stroke engine with direct belt drive, is in constant use at an R.A.F base of the C.M.F. It has a cruising speed of 12 m.p.h.

News in Brief

A WORLD'S long-distance record was set up last week by a Superfortress of the U.S.A.A.F. which flew the 8,198 miles from Guam Island, in the Pacific, to Washington in 35 hr. 5 min.

* * *

Sir John Anderson is rejoining the board of Vickers, Ltd., from which he resigned on being appointed Lord Privy Seal in November, 1938. Other additions to the Vickers, Ltd., directors are Sir Clifford Figg, Sir Thomas Merton and Lt. Gen. Sir Ronald Weeks.

* * *

The Department of Overseas Trade has now moved from Dolphin Square to 35, Old Queen Street, Westminster, London, S.W.1 (Tel.: Victoria 9040), and all communications should now be addressed to the Comptroller-General at the new address.

* * *

Denying a statement that the Air Force authorities had called for volunteers to serve with the Netherlands East Indies Air Force, Mr. A. S. Drakeford, Australian Air Minister, said that no R.A.A.F. personnel would be permitted to leave Australia to serve with the Dutch forces in Java.

* * *

The first Arctic automatic radio station, designed to conduct meteorological observations without personnel to service it, has been set up on an island in the Kara Sea, said Moscow Radio quoted by Reuter. The station apparatus, which is constructed to work for two years without overhaul, transmits weather forecasts regularly by means of a special wireless code.

* * *

Sqn. Ldr. H. Clements, having been released from the R.A.F., is taking up an appointment with Silentbloc, Ltd., and their subsidiary, the Andre Rubber Co., Ltd. He will be concerned with the technical and commercial developments of the firms' products in the North of England and Scotland.

* * *

Aviation equipment is being released by the U.S. to authorised Argentine purchasers "exclusively for civilian use in the development of private and commercial aviation." In making this announcement, the U.S. State Department adds that the action is the result of wartime restrictions being ended and is "totally unrelated to any political considerations."

* * *

Sir Allan Gordon-Smith, whose name has been so long associated with the "Smith" group of companies, has recently been appointed chairman of S. Smith and Sons (England), Ltd., and its associated concerns. Sir Allan, whose grandfather founded the business, became managing director in 1913 when the firm became a limited company.

* * *

The Scientific and Technical Group of the Royal Photographic Society is at present running a series of lectures on "How it Works in Photography" as part of its campaign to foster interest in scientific and technical applications. Photography is being increasingly used in engineering research and development.

* * *

After six years with the R.A.F., Wing Cdr. H. M. Samuelson has rejoined Smiths Aircraft Instruments Ltd.—the aviation division of S. Smith and Sons (England), Ltd.—and has been appointed the firm's technical sales director.

* * *

Flt. Lt. L. R. Watson has been appointed to the post of assistant sales manager to R. K. Dundas, Ltd., of Portsmouth, on leaving the Empire Central Flying School at Hullavington, Wilts, R.A.F. Station.

* * *

Edmonton, Alberta, is to be the base for important R.C.A.F. experiments in the "winterisation" of Canadian and British aircraft. Col. C. W. G. Gibson, the Canadian Air Minister, said that experiments "at the lowest temperatures" would be carried out at advanced bases in the sub-arctic, and that the British Air Ministry and M.A.P. were sending them scientific and ground crew personnel.

* * *

The first reunion of the Pathfinder Force is to be held by the Pathfinder Association, Ltd., on Friday, January 11th, 1946, and all ranks who served in the P.F.F. (8 Group) are invited. Admission is by ticket only (single 21s., double 30s.), which is obtainable from the secretary, 115, Mount Street, London, W.1. The reunion will be held at Grosvenor House, Park Lane, W.1. The association's club premises and appointments bureau at 115, Mount Street, are now open to all members.

* * *

The Australian chief of air staff (Air Vice-Marshal Jones) recently announced that Australia is establishing factories for building jet-propelled and gas turbine-driven aircraft. He said that the Government had decided that Australia would never again be without strong air defences, and the use of atomic energy and guided missiles was another phase of defence that would have to be pursued.

* * *

As an addendum to our report on the Gloster-Meteor record, it should be said that in the case of the Rolls-Royce Derwent engine an important part in the success of the attempt was played by bearings made by the Fischer Bearings Co., Ltd., of Wolverhampton. These included the very highly stressed ball and roller bearings of the turbine shaft.

BOEING'S LATEST: A new "pursuit ship" (fighter to us) from the Boeing concern which is reported to have a top speed of 450 m.p.h and for which exceptional versatility is claimed. Note the large air scoop, rearwardly retracting undercarriage, and contra-rotating airscrew

Inquest on Chaos

What Shall be Done with Germany's Research Equipment? : Some Afterthoughts on a Technical Mission

By SIR ROY FEDDEN

The author. A study by Dorothy Wilding.

WHEN the plans were made for our M.A.P. mission to Germany during the summer, we realised that we had undertaken an ambitious programme, and the map with which we were provided showed no fewer than 52 places to visit; but we little knew how great the difficulties would be, and how much scheming we would have to do in order to cover half of what we intended to accomplish.

We were to earmark and note suitable plant and research equipment for the new college of aeronautics to be set up at Cranfield, Bedfordshire, and to investigate and report on certain aspects of power plant, especially the engineering and production approach on jet engines and their state of production potentiality at the time of the collapse of Germany.

We arrived at a particularly difficult time. Two days before we started, the re-orientation of the areas to be permanently occupied by the various Allies had been announced, and when we arrived a sort of general post was in full swing. The Russians were taking over large additional areas, the Americans were moving out of some places and the British from others, and considerable confusion reigned. The advance of the Red Army meant that some of the important targets had to be struck off our schedule, but we managed to visit 33 places.

We were profoundly thankful that we had been given adequate transport, and the method of taking our own Jeeps in the Dakotas was of immense value. At first we had some delays in getting them in and out, but the crews soon became expert, and in a few days it was possible to be on the road in ten minutes or so after touching down. Motoring at night had its hectic moments, particularly on the *autobahnen*, where bridges and viaducts had been systematically demolished by the German Army. Diversions were usually marked, but it was not unknown for the signs to have been demolished by a heavy Army vehicle.

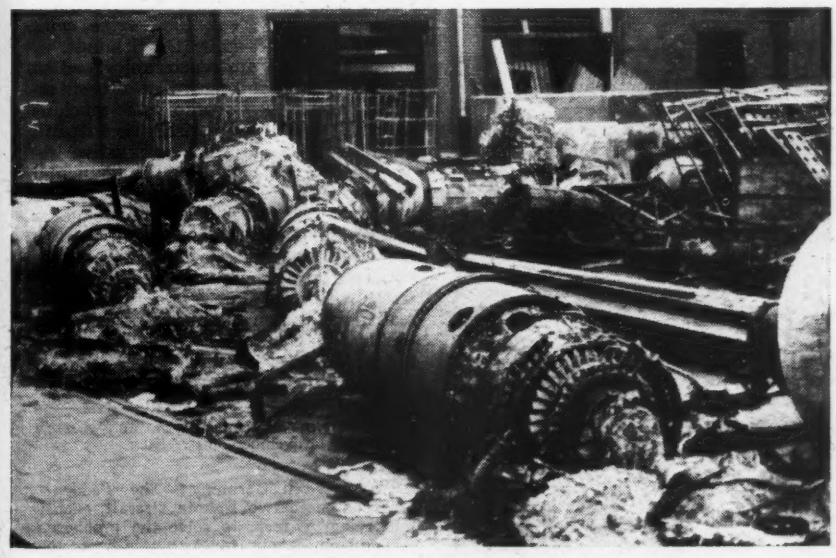
Even after a fair interval of time, one's impressions of German aeronautical progress are constantly overshadowed in the mind by the tremendous social, moral and economic problems imposed by the condition of Germany today. I knew several leaders of the German aircraft and engine industry for many years before the war, and it was a sombre experience to meet them again after seeing the horrors of the slave camps like Nordhausen, with its incinerators for the corpses and the pitiful shambles of maimed and dying humanity. The Germans individually cannot escape responsibility for the collective actions which have consumed millions of innocent victims. For the most part these leaders of industry seemed quite unrepentent, and thought it was bad luck they had lost after so nearly winning.

Far-reaching decisions face us over the future of the German scientists and research workers. Are we to use their vast accumulated knowledge for peaceful ends, or treat them as outcasts? The Russians, as they so often do, seem to have made their own decision and acted upon it. I heard of one Bosch engineer, whose family I knew before the war, who had swum the Elbe to get out of the Russian zone; he said that the whole equipment of the Bosch research headquarters at Spandau, with all its technicians, had already been removed complete into Russia.

The economic problems arising from the sharp division of Germany into zones of occupation are equally pressing. The British zone seems to be badly placed in that it lacks major food-producing areas, most of the raw materials of industry, and precision engineering facilities. As a result we have been using our own food stocks to support the population for which we have become responsible.

Many of the opportunities which existed for first-hand investigation of the most interesting German projects have now been lost. Some of the most important production and research establishments, having passed into Russian hands, are no longer open to British investigators, although many of them could have been visited freely for some weeks after the collapse. Elsewhere prototypes, experimental equipment, records and drawings have been taken away in truckloads by various Allied interests.

The Americans have put tremendous drive into combing every aspect of German



The crippling strain imposed by our bombing on German efforts to perfect new weapons is well illustrated by this jumble of bomb-damaged 004 jet units at Magdeburg.

D

INQUEST ON CHAOS

aeronautical technique, and their greater man-power and unlimited transport facilities have enabled them to do the whole thing on a thorough and systematic plan. Their technical investigators in uniform followed closely on the heels of the combat troops—so closely that some of them were captured when Runstedt launched his offensive last year.

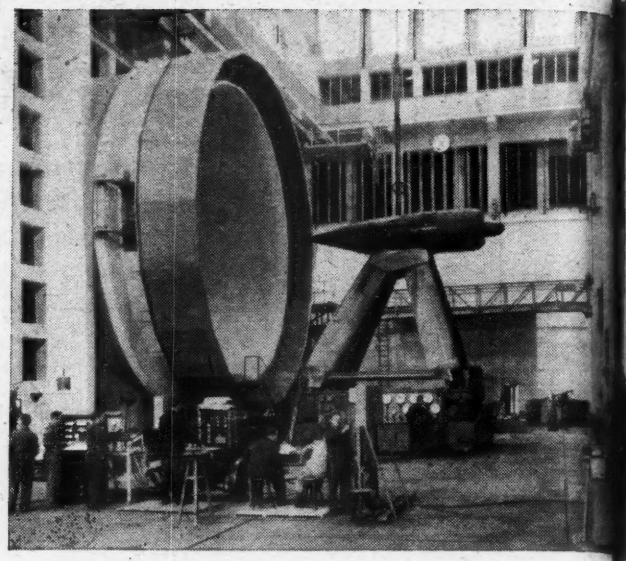
My own mission received every possible co-operation, but in general the limitations of manpower and transport, and the intensity of our own war effort, had prevented us making such thorough use of the opportunities presented by the enemy collapse.

Their lavish expenditure on high-speed wind tunnels has given the Germans a mass of data on the problems of flight at sonic speeds which is not available elsewhere, and they have made strides with new methods of propulsion, regarding the gas turbine as only one of several lines to be investigated on high priority.

Policy Proved Right

As the war progressed, Intelligence reports kept our people informed on the progress of the new aircraft, the high-speed jet bombers and fighters, the new rocket aircraft like the Me 163 and BP20, and the robot rocket weapons such as V2 and V3 or Schmetterling (Butterfly); and there must have been a grave temptation to divert men and materials to similar projects of our own. Fortunately the Allies continued the policy of maintaining the maximum current effort while concentrating development work on full and thorough preparation of a few new types.

The Germans were undoubtedly very bold to attempt large-scale production of jet-propulsion units in face of the shortage of suitable materials, but by ingenuity they had evolved types which they were building at the rate of 3,000 per month, and they had built up a chain of bomb-proof underground factories, which they expected would step up production to a rate of 100,000 units per annum by the middle of 1946. On the other hand, it is now common knowledge that we were developing new jet-propelled types which provided further evidence of the amazing instinct of British designers for getting first-class results with simple equipment despite shortages of trained scientific personnel and research workers.



AT VÖLKENRODE: The Hermann Göring wind tunnel, which has a maximum velocity of 300 ft. per sec. and a diameter of 26ft.

Our strategy and simple technical policy were, fortunately, successfully timed and co-ordinated to ensure the defeat of the enemy. But dare we ignore the work of the German scientists, which points the way to tremendous developments in the future? If we are to maintain a leading position in aeronautical progress, no time should be lost in making available to British scientists the most modern research equipment in the world—to wit, that existing in Germany—in order to provide indispensable data on which our designs of the future must be based. The design of high-speed aircraft is now passing into a state where improvisation will provide no substitute for the fullest scientific investigation.

A good deal of fundamental engine research work was going on at several German laboratories, and particularly at Völkenrode.

So much has already been said about the impressive array of wind tunnels and aeronautical research at Völkenrode,* that I am of the opinion that there is a tendency to overlook the engine work that was being done by Dr. Schmidt.

The Germans are remarkably good at documentation and recording of their results; in fact they overdo it, as much as we tend the other way. There is a wealth of German monographs, exhaustive research reports, etc., on fundamental matters relating to all types of prime movers for aircraft that we have never had the time, inclination or equipment to tackle. I hope these will be translated, sifted and examined by us while they are fresh; added to our very practical and realistic approach to aircraft power plant problems in this country, they may prove to be of very real value.

One cannot make such a tour without

Transport in Germany: The Fedden mission used two Dakota aircraft, each carrying a Jeep, to solve the problem of moving about rapidly in a country where life had come to a standstill.

* See *Flight*, September 27th, and *Aircraft Production*, November, 1945.—Ed.

Empire Requirements

—With Particular Reference to the Australian Civil Aircraft Market : Why America "Gets Away with It"

By "FLAPJACK"

IN considering the problems of designing, building and marketing civil aircraft for our Dominions and possessions, it is necessary in the first place to have some understanding of the geographical layout of each country, of its economics and of the characteristics of its inhabitants.

This is particularly true of Australia. First and foremost, one must appreciate its vast area. It has a coastline of some 11,000 miles. Queensland, which comprises only about an eighth of the total area, is five times the size of the British Isles.

The climate varies from temperate in the South (including Tasmania)—comparable with that of our own South Coast—to tropical conditions with monsoon rains, as in Tropical India and Burma. In between these two extremes are sub-tropics, and extremely hot, dry climates with temperatures rising to 120 degrees. Elevation is in the region of 1,500 to 2,500ft. in the East, except for small areas which go up to as much as 7,000ft. in the south-eastern corner (e.g., Mount Kosciusko), and 500ft. to 1,000ft. in the West. Much of the Northern Territories is mountainous and covered with thick jungle country of a tropical nature.

VICKERS VIKING

Land transportation is poor. Most of the railways are single tracks, while different gauges in each State entail changing and delay at State borders. Most outlying districts are served by only two or at the most three passenger services per day, which are necessarily slow due to the number of stops made. The railways are state-owned, and up to the beginning of the war showed an annual deficit of some millions. Roads are not very good except for the inter-state highways, but freightage by road is not practicable over the long distances involved.

Operating Conditions

In the past we have lost quite substantial markets in Australia to our American competitors—mostly, I think, for the simple reason that American operating conditions are much akin to those of Australia. This is why one sees much American machinery—in particular, motor vehicles—in use there. This importation of American exports, partly finished and finished, has to a certain degree tended to Americanise the country mechanically.

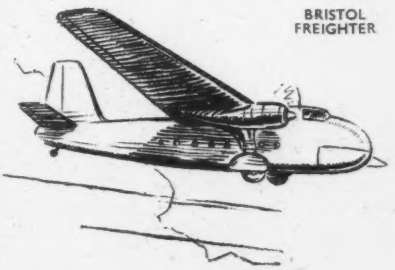
It will be very foolish for us to continue to ignore this infiltration. The Australian is not the sort of person to stick to a certain product for patriotic motives; he is not easily fooled, and, like everybody else, wants value for money, so he will buy a thing whether it is British, American or Chinese.

The war has done much to pave the way for civil aviation progress in our Dominions and possessions, particularly in the development of power plants to suit climatical conditions. Two companies, Bristol and de Havilland, should have gained very valuable knowledge in this field.

The principal airline company now operating in Australia, apart from Qantas, is Australian National Airways, who at the moment run 25 aircraft, 16 of which are on wartime charter to the company. The latter consist of six Douglas C.47s, one Lockheed 14, one Short Sunderland S.23 Empire flying boat, one D.H.89 from Qantas, two D.C.3s from the R.A.A.F., and five Douglas C.47s from the U.S. Army. The permanent fleet consists of three D.C.3s, five D.C.2s and one D.H.89. These figures suggest a swing towards American types, and the reason is unquestionably that the Americans have produced the right aircraft for the right job.

DE HAVILLAND DOVE

A brief glance at the history of Australian National Airways is also significant. The company was formed originally in 1932 by Victor Holyman, of Holyman Airways, doing yeomanry work with a Fox Moth. As the company forged ahead with this one little aircraft, it was decided to purchase more aircraft. A D.H. Dragon was bought, followed in 1934 with a D.H.86 and further D.H.86s from time to time. Other companies were now being formed, such as Adelaide Airways, New England Airways, Rockhampton Aerial-Service, North Queensland Airways and West Australia Airways. Most of these lines were running British aircraft, with the exeeption of a few Stinsons and Ryans. Guinea Airways, Ltd., which operated Junkers G.31s and W.34s and Ford Trimotor 5A.T.s and 4A.T.s, confined itself to New Guinea until it opened up in Australia in late 1937 with Lockheed Electras. In 1936, with the exception of Guinea Airways, the majority of these concerns were absorbed into A.N.A., *with a preponderance of American aircraft.*



BRISTOL FREIGHTER

It is a great pity that the Ministry of Aircraft Production had not the foresight to appreciate the immense ultimate value of a transport machine for war purposes, particularly to supplement land transportation in the Far Eastern theatre. The net result of its policy has been that our own aircraft industry has been forced grossly to over-produce other types, in some cases completely redundant or obsolescent, with the result that we have now enormous graveyards of absolutely brand-new aircraft rotting, with no prospects of becoming airborne on peacetime duties. It is well known that certain British aircraft manufacturers tried hard to get permission to build transport aircraft, but to no avail. Now, instead of seeing Vikings flying relief supplies into remote places, we see the Dakota and the Commando.

[*Continued overleaf*

Sketches by C. W. Langley

EMPIRE REQUIREMENTS

The speed at which our own belated transports for future civilian use are beginning to appear shows that firms were champing at the bit to get started long ago For the Australian trade, I feel that the Vickers Viking has good prospects of making a name for itself, likewise the de Havilland Dove with the D.H. pre-war fame for efficiency, reliability and economy. I have yet to hear a pilot say a bad word for the predecessors of either of these two aircraft in the past ten years. The Viking and Dove seem ideally suited to Australia's main routes and feeder services. They have the essential characteristics required, which are good take-off from small spaces (such as roughly constructed airfields), reasonably low landing speeds, and good payloads—it is the weight-lifters that will cash in.

Sheep-station Aircraft

Two other aircraft which would seem to have a future in Australia are the Bristol Freighter and the little Miles Aerovan. The designers of both these aircraft have used their imagination to good effect. This type, which can be easily converted from freight to passenger work, will be of the greatest value in remote places, and should prove ideal for development work. The Aerovan should be of particular interest to the large property-owners with 30,000 to 50,000 acres (quite a common size for a sheep or cattle station), though I do suggest that this little aircraft would have a better market there if a stressed-skin version could be made; it would be less easily damaged, for it would be used for carrying anything from a sheep to a portable engine.

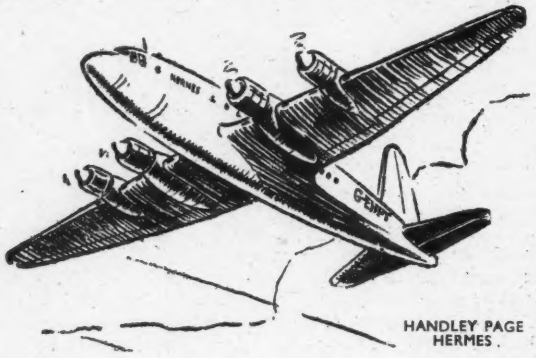
Suitable versions of the Avro Tudor and Handley Page Hermes would be an asset for the transcontinental work and routes to India (as operated by Qantas Airways), and for the Australia-New Zealand route.

Air transport in a place like Australia is more of a necessity than a luxury, as shown by A.N.A.'s figures for the period 1936 to 1944. In the half-year July-December, 1936, they flew 6,612 hrs. and 801,366 miles, and carried 7,625 passengers, giving 97,222 freight miles and 4,939,000 passenger miles. For the period July-December, 1944, the figures jumped to 328,175 hrs., 44,113,306 miles, carrying 783,329 passengers, 11,065,495 lb. of freight and 17,822,131 lb. of mail (347,301,768 passenger miles). It must be borne in mind that the population of Australia is only between seven and eight millions. In 1944 the network measured some 10,000 miles, the longest flight being 1,823 miles from Melbourne to Perth, which is three times the distance from London to Berlin, or farther than London to Moscow.

As it takes seven days to cross this 2,300-mile continent from east to west by fast passenger train, and fourteen to go round by fast ship, there would appear to be a great opening for an enterprising design of multi-engined freight aircraft to carry, say, 15,000 to 20,000 lb. at a cruising speed of 160-200 m.p.h. Such a machine should sell well provided it had an all-up weight range of 1,000 miles in still air.

AVRO TUDOR

MILES AEROVAN



HANDLEY PAGE HERMES.

It is essential that all power plants should be tropicalised, including the use of an air intake cleaner such as that used in the desert campaigns. Constant-speed airscrews are taken for granted.

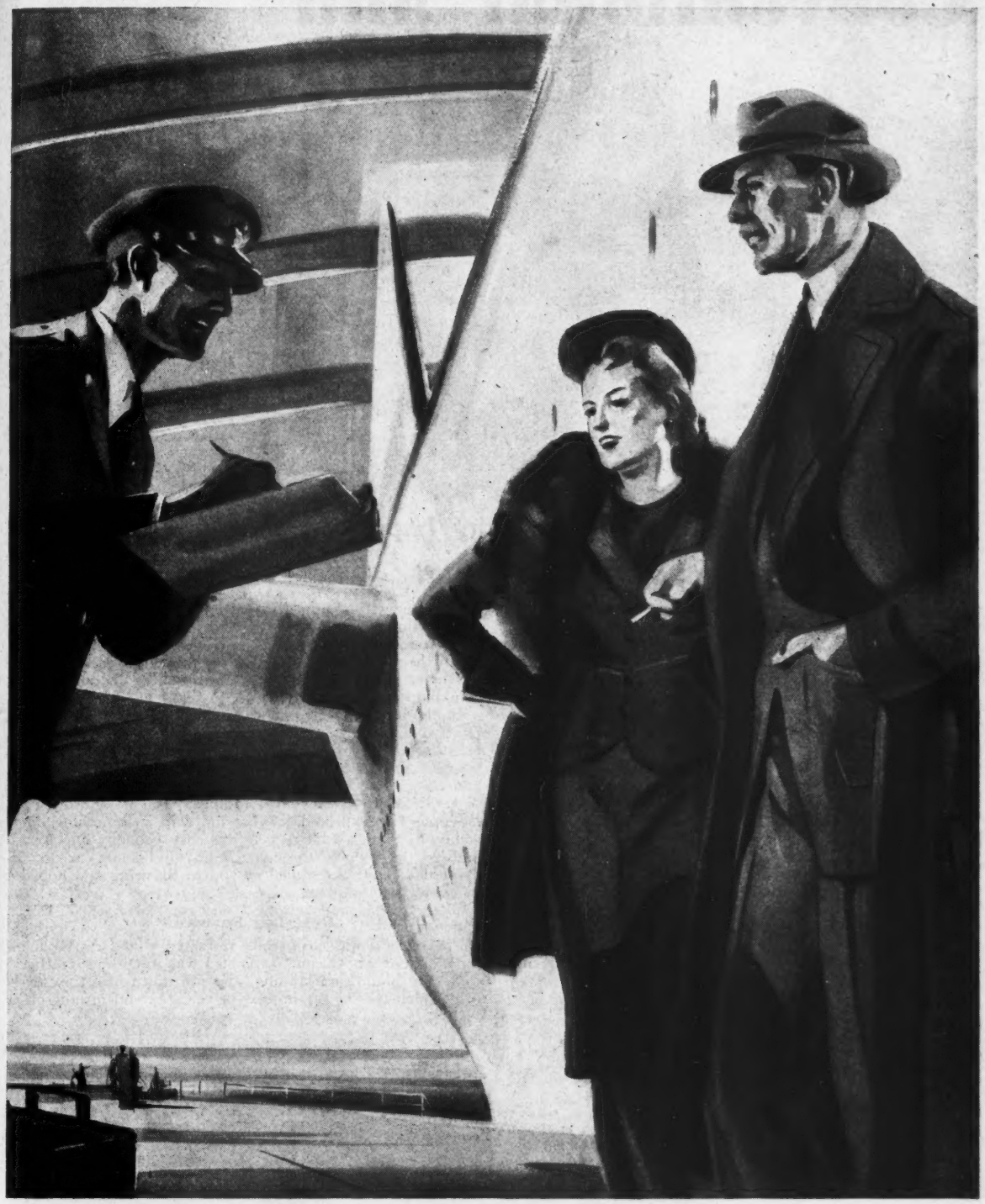
The machine must have a high safety factor. All twins must be able to climb fully loaded on one engine over the highest obstacles likely to be met *en route*. Likewise, multi-engined aircraft must be able to give the same performance with one engine out. These safety factors must be coupled with economic operation to make the aircraft an attractive proposition.

Our engine manufacturers have pulled off a magnificent job in the past six years and we have the best airscrew designers in the world. With the airframe manufacturers it is up to them jointly to produce the right aircraft for the right job. We produced the world's best for the war. Why not for the peace? One only hopes that the mania for fulfilling Atlantic and European requirements does not jeopardise equally large potential markets in lands farther afield, where air transport is a real necessity. Designers will have a big task to capture the overseas markets, where aircraft like the Dakota, Commando and Skymaster have passed their tests with flying colours.

And now a word on light aircraft for private use or occasional charter work in our Overseas Dominions and possessions. The first aim should be not to produce individualist types for the few privileged people with money burning a hole in their pockets. What we want is an aircraft that will give satisfaction to the English private owner and be equally useful as a business proposition to the Australian 500 miles "out back." I suggest fabric or stressed-skin (with as little wood as possible) cabin type with as roomy a fuselage as design permits, to carry, say, four adult passengers with week-end luggage. It should be powered with a 150 to 200 h.p. engine to give an economical cruising speed of around 120 to 130 m.p.h. Stalling speed must be in the region of 25 to 35 m.p.h. with a respectable take-off performance of around four hundred yards fully loaded. A non-retractable, wide-track undercarriage would be of great assistance to the not very experienced pilot and would reduce maintenance. A self-starter is as essential on a light aircraft as it is with a motor car. A simplified blind-flying panel, made up of an artificial horizon and directional indicator, is also wanted. The price should be round the £1,500-£2,000 mark at the most.

Incidentally, do not let us have to wait three months in Australia for spare parts to be sent out from England as was the case in 1936. Efficient spare-part and servicing facilities must involve a world-wide organisation—you can buy any spare part for a Ford vehicle in any part of the world, whether it be New York or Tibet. The Americans are sure to have such organisations going as soon as we can all return to peacetime status. Good prospects of spares and servicing facilities can influence the intending buyer of an aircraft, just as they sway the prospective buyer of a motor car.

SUPREME FOR OCEAN TRAVEL—THE BRITISH FLYING BOAT



"Yes . . . a longish trip Sir. You'll appreciate the comfort of a flying boat . . ."

SAUNDERS-ROE

Designers and builders of British flying boats—Saunders Roe Ltd., 49, Parliament Street, London, S.W.1. Telephone: Whitehall 7271.

Conventional and Unconventional

The engine position in the Airacobra gave the pilot a good range of view.

Another of "Indicator's" Handling Impression Series : The Bell Airacobra and Two Early Curtiss Fighters Remembered

THE British-trained pilot must necessarily "live" for several weeks in American fighters if he is to learn to appreciate them, and if one of them happens to be unconventional in the extreme sense, the recovery action is even more delayed. Of course, the layout is all very neat and tidy in every American type, and makes the average British cockpit look like a blacksmith's shop; but we have grown up with all the bits and pieces and have learnt to like it that way.

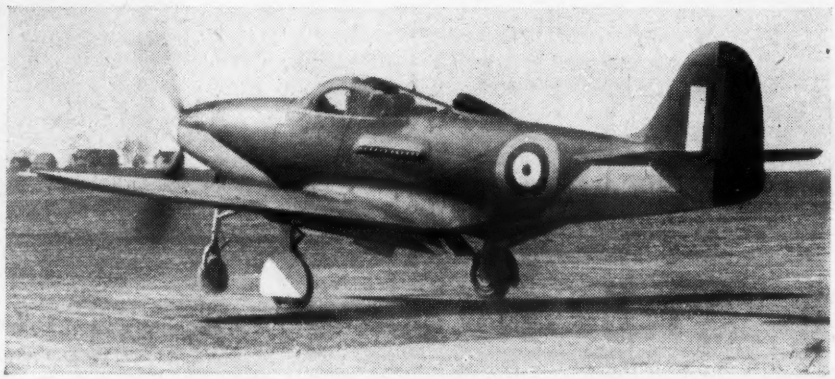
Obviously, it would be unfair to judge the modern American fighter by the yardstick of some very early attempts. The three aircraft I have bunched together—the Airacobra, the Tomahawk and the Kittyhawk—were slow and had a very poor altitude performance even when compared with British fighters of the same period. American designers have gone a long way since then, with or without the help of British power-units and early European fighting experience, but these machines helped to fill the gaps and the Curtiss fighters, at least, did good work in Africa and the Far East. From my own non-operational point of view, all three handled nicely and offered no difficulties.

The Bell Airacobra, of course, was something quite new, with its Allison engine sitting in the small of one's back, with a propeller-shaft between one's legs, and with a tricycle undercarriage. Nevertheless, it must be confessed that there was still so much cowling in front of the screen that one was inclined to forget the disposition of the major items except while taxying—when the shaft, under varying loads, whipped about in a noisy frenzy from time to time. One learnt to taxi with lots of throttle and with the treadle brakes hard on in order to reduce the grindings down below. Which reminds me of the perfectly true story of the fitter, new to the type, who poured glycol into an Airacobra's reduction gear, thinking it was the header-tank.

In the air the Airacobra had one peculiarity caused by relative c.g. position. While recovering from a dive the aircraft tended to organise its own pull-out to no mean degree if the speed happened to be above a certain figure, and things had to be handled firmly if the structure was to be saved from excessive loadings. I'm not quite sure how was one expected to abandon ship if something *did* come off, though I daresay it was easy enough; for entry and exit were made through a miniature saloon-car door Presumably one just rolled out on to the wing and hoped to avoid the tail-plane.

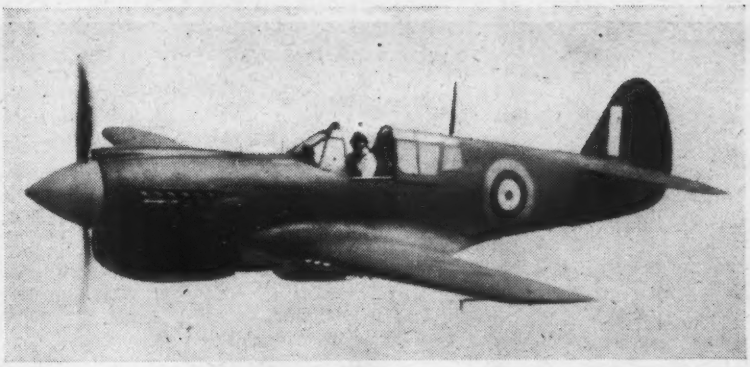
Best Leg Forward

The tricycle was electrically retracted, and I can vouch for its strength. On one occasion I was forced by weather to a very immediate landing, and put down in a tiny airfield which was in the process of being extended and run-



An R.A.F Airacobra taking off. Only one squadron was equipped with these aircraft, and later all the Airacobras were sent to Russia.

wayed. In the prevailing drizzle and tree-high cloud my arrival direction was a trifle out as far as the selection of the longest of the short runs was concerned, and I finished up travelling at very high speed amongst a typical Works and Bricks display of ditches, stones, concrete-mixers and mud. They dug me out, and when the weather cleared I took off and absent-mindedly raised the undercarriage, which I had intended to leave down until it could be given a retraction test. All was well; it went both up and down. The undercarriage, incidentally, had a manual emergency gear, with a two-position selector to suit. A friend of mine once took off with this selector in "manual" and then selected "up"; nothing happened, of course, except a loud scream from the warning horn when the throttle was eventually brought back. It was landed in this condition, with the legs unlocked but held by the manual gear. When we had guessed what was wrong, we just wound the handle until the horn stopped blowing—probably the first time that an undercarriage has ever been locked and unlocked successfully while not safely on jacks.



The Curtiss Kittyhawk which was a development of the Tomahawk. A 1,150 h.p. Allison V-1710-F3R engine was fitted and a top speed of 366 m.p.h. was claimed. The Kittyhawk had electrically driven aileron trimming tabs.

Oleo-Electric Wheel Raising

My miserable total of hours on the Tomahawk and Kittyhawk give me no right to discuss them, but I remember them as being pleasant enough in the air, though inclined to be skittish on the ground when three-pointed. Most pilots appear to have given this characteristic best, and been satisfied to bowl them on to the wheels. Undercarriage raising, as with many American types of that era, was something of a business. The operation was made possible by a hydraulic pump driven by an electric motor, so one had to select "up" on an inconveniently placed lever, and then press a blip-switch on the control column—and keep on pressing until the indicators showed that the legs were up. The same procedure applied to the flaps, but here, at least, one could select the required motion in good time and happily use the button to adjust one's arrival. The hydraulic actions had none of the "snap" to which we had become accustomed in the British systems even of that era, and the "pictorial" indicator was pretty but not very practical. However, there were the warning light and horn to assist us, and the indicator did tell us where the undercarriage and flaps were in their intermediate positions.

Earlier versions, at least, had neither boost controls nor throttle stops, and care was needed both when opening up on take-off and when pre-setting the c.s. control. The complicated fuel system, too, involved the driver in far too much watching and waiting and re-selecting for any degree of mental comfort. But I suppose the British fighter pilot was already being spoilt by the increasing simplicity and self-operation of his aircraft—or maybe the designers held a lower opinion of his intelligence and were trying to do the thinking for him!

LAST TRAINEES IN CANADA UNDER AIR PLAN

GRADUATES in the final course of United Kingdom aircrew pupils in Canada have recently passed out from training. They were the last of over 131,000 trainees who have received flying instruction in Canada under the British Commonwealth Air Training Plan.

In a message to the Canadian Minister of National Defence for Air (Col. the Hon. Colin Gibson, M.C., K.C., V.D., M.P.), the Secretary of State for Air (Viscount Stansgate, D.S.O., D.F.C.) referred to the important part which the scheme had played in the successful conduct of the war, and thanked the Minister and the R.C.A.F., on behalf of the British Government, for all they had done in furthering the great enterprise.

The training scheme in Canada would, he said, always remain as an inspiring example of what could be achieved, despite difficulties and adversity, by splendid co-operation and the will to succeed.

In his reply the Minister of National Defence for Air said Canada was proud of her association, with her partners, in the British Commonwealth Air Training Plan.

The Canadian people shared the firm conviction that the same spirit of friendship and co-operation which carried the Allied efforts to such successful accomplishments in war would continue to be a source of pride and strength in the days of peace.

Since the first of the training schools was opened under the plan in May, 1940, over 131,000 members of aircrew have been trained in Canada, and of these some 32 per cent. were members of the R.A.F., the remainder being from the R.C.A.F., the R.A.A.F., and the R.N.Z.A.F. In addition 5,296 R.A.F. and Fleet Air Arm personnel received training in R.A.F. schools in Canada and graduated before July, 1942, when these schools were brought into the Air Training Plan.

The training reached its peak in January, 1944, when there were 73 B.C.A.T.P. flying-training schools and 24 R.A.F. transferred schools in operation. Units and schools operating during the time the plan was in existence totalled over 350 and operated from more than 230 sites. The Canadian Department of Transport undertook the construction of runways, and over 35,000,000 sq. yd. of asphalt or concrete were laid—the equivalent of 2,700 miles of 20ft. road. There were many difficulties to face and many vital decisions to be taken.

When France collapsed and a German invasion of Britain seemed imminent, the sponsors of the Air Training Plan had to decide whether to carry on with the training scheme or whether to cast it aside and send every available R.C.A.F. aircrew and aircraft to defend Britain. The long-range view prevailed.

Later in 1940, because of the constant interference by enemy aircraft with training in the United Kingdom, the R.A.F. transferred bodily a number of training schools to Canada.

OPEN HOUSE AT FARNBOROUGH

FOLLOWING the "semi-private" view, the R.A.E. exhibition at Farnborough was declared open to the general public, and a large number of visitors, mostly members of A.T.C. Squadrons or Spotters' Clubs, arrived to inspect the last word in German aircraft design. Most of the British aircraft had "gone home," but a Lincoln, Meteor IV, Tempest II and Tempest V remained on show.

Although there was no flying display, much interest was attracted by the varied selection of German aircraft lined up on the tarmac, and by the exhibition of latest British and German engines and equipment in the hangars.

A long queue formed to inspect Admiral Doenitz's personal aircraft, a luxuriously appointed Fw Condor. A swarm of schoolboys covered a Fw 190D bearing the notice "No restrictions on this aircraft. Climb in and operate the controls to your heart's content"! The authorities drew the line, however, when quite large pieces of the aircraft began to disappear

Apart from this, however, the public was well behaved.

A-WAKE...

With glistening wake, M.T.B., M.G.B. or Rescue Launch from the British Power Boat Company's Yards has flashed its way into world headlines throughout the sixty-eight months of war. This company, too, is awake—awake to the needs of the commercial and overseas users to whom fast motor craft have so long been denied. The day when such demands will be met is now at hand.

THE BRITISH POWER BOAT COMPANY LTD.

HYTHE. SOUTHAMPTON MANUFACTURERS OF HIGH SPEED CRAFT FOR ALL PURPOSES

Anglo-American Skymaster

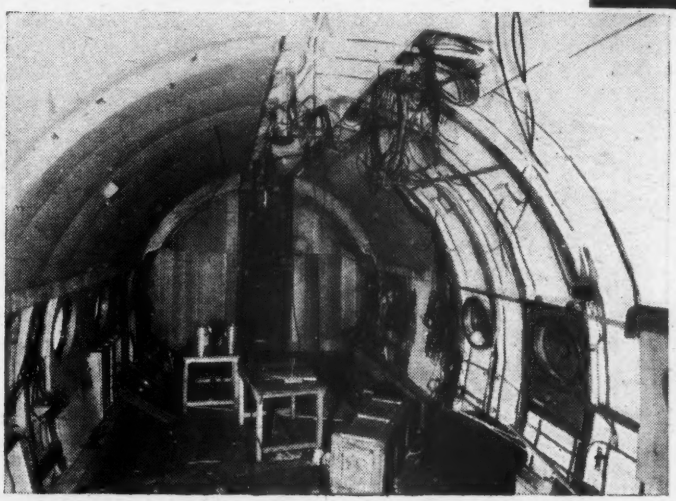
Mr. Winston Churchill's Special C-54B Described : Utilitarian Luxury for Long-distance Journeys

AT intervals during the last twenty years special aircraft have been produced from time to time and have been variously described as "luxury air yachts" or "flying hotels." But it required the special conditions surrounding a British Prime Minister's wartime duties, and his need for fast transport, to produce an aircraft which is the most outstanding example of such a special conveyance.

It will be remembered that in 1944 the late President Roosevelt presented Mr. Winston Churchill with the Douglas Skymaster for use on his many and varied travels. This Skymaster arrived over here in freighter "shell" form and Armstrong-Whitworth Aircraft were given the work of converting this "shell" into an aircraft which was, in the days of vital secrecy, alluded to as a "special transport." The more specialised work on the aircraft was sub-contracted to L. A. Rumbold and Co. and to the General Electric Co.—the former being responsible for all furnishing and sound-proofing, while the special electrical equipment was handled by the latter.

Decibel-hunting : Mr. Rumbold goes to work in search of causes and effects. The noise level in the "owner's state-room" of the Skymaster was as low as 52 decibels.

The conversion of the C.54 from freighter to private transport involved the firms concerned in work virtually of a design character. The entire layout had to be re-arranged with new partitions, the radio and electrical equipment revised, the existing ventilating system modified, the oxygen system extended, and an ancillary power unit, to provide heat and power on the ground, had to be added.



Some idea of the amount of work to be done can be gained from this view inside the Skymaster soon after it arrived.

In its finished form the layout, viewed from nose to tail, includes the pilots' compartment, with the radio operator's alcove, the crew's toilet and the flight engineer's compartment behind and on the port side ; the two fuel tanks ; the two passenger toilets ; the passenger compartments with the galley on the starboard side ; the conference room

The conference room, with its walnut table and swivelling and sliding chairs, could also be used to provide additional sleeping accommodation.

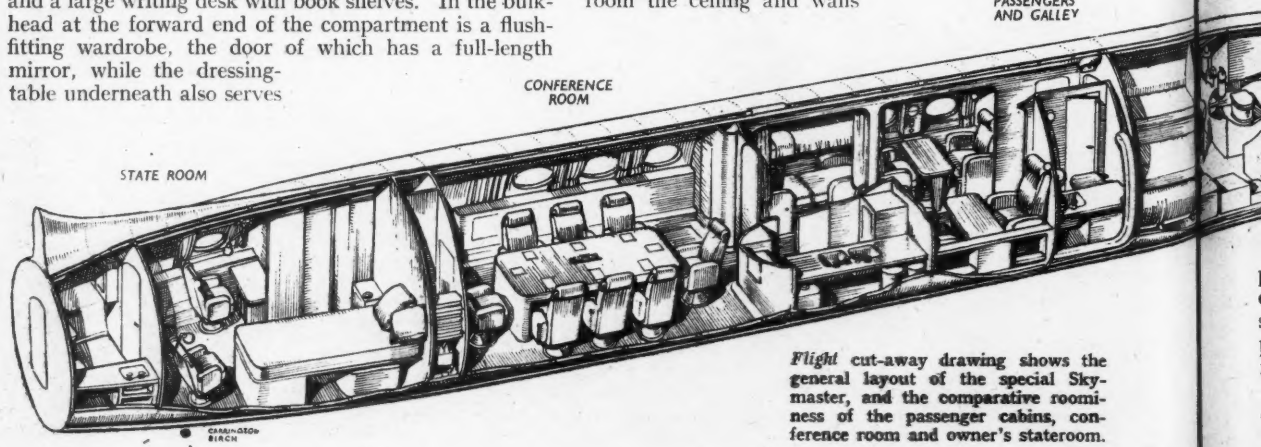
ANGLO-AMERICAN SKYMASTER

in which two emergency bunks are stowed; and the owner's stateroom and toilet. Beneath the crew's quarters is the SCR-695-A radio, the auxiliary power unit, and the modified oxygen system. The entire aircraft from the bulkhead aft of the tanks is soundproofed.

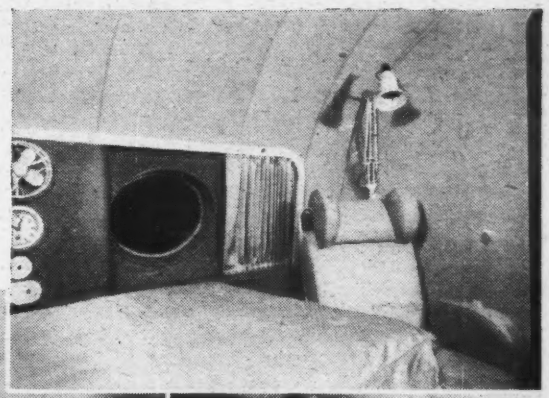
All Mod. Con.

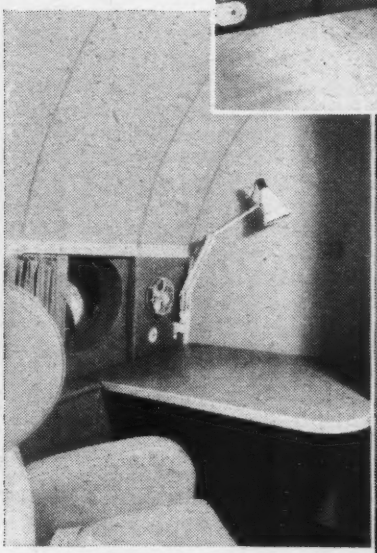
The owner's stateroom in the rear of the fuselage can be considered as a self-contained suite. The furnishings include a divan, two swivelling and sliding armchairs, and a large writing desk with book shelves. In the bulkhead at the forward end of the compartment is a flush-fitting wardrobe, the door of which has a full-length mirror, while the dressing-table underneath also serves as a bedside table. The compartment is lit from ceiling lamps, assisted by two suitably positioned Anglepoise lamps and a third which is flush with the bulkhead at the head of the divan. On the starboard wall there is an electric fan, a clock and the necessary oxygen controls. Ceiling and walls are leather-covered.

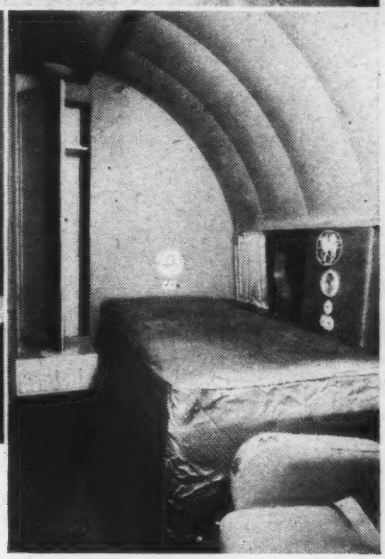
The aircraft's main entrance door opens into the compartment known as the "conference room," with its large walnut table and eight adjustable chairs, serving hatch from the galley, and cocktail cabinet. As in the case of the owner's stateroom the ceiling and walls



Flight cut-away drawing shows the general layout of the special Skymaster, and the comparative roominess of the passenger cabins, conference room and owner's stateroom.





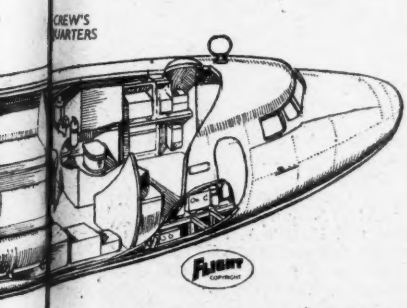


Three passenger "cabins" were provided and each could be easily converted for sleeper use (left). On the right is a view of the owner's stateroom, with divan and easy chair.

Above is another corner of the stateroom, with desk and working lamp, while on the right is the view looking forward — a "reverse," so to speak, of the view above and on the right.

are leather-lined with a walnut veneer below. Two emergency bunks are stowed on the starboard side.

There are three separate two-passenger cubicles in the passenger compartment, each of which can be quickly converted for sleeper use. The galley may be said to take the place, in symmetrical form, of a possible fourth alcove. There is a table in each of the three cubicles, while, apart from the ceiling lights, a reading lamp is mounted on the wall above each of these tables. Oxygen masks and oxygen control equipment is stowed in small compartments below the windows. At the forward end of the passenger compartment, one on each side of the passage-way, are the toilets, complete with electric razors, hot and cold water and lighted mirrors.



Very great care was taken in the sound-proofing of the Skymaster. The noise level in the owner's stateroom is as low as 52 decibels at cruising speed, with a level of 62 decibels for the passenger compartment. To give a comparison, these figures compare more than favourably with those for a luxury car.

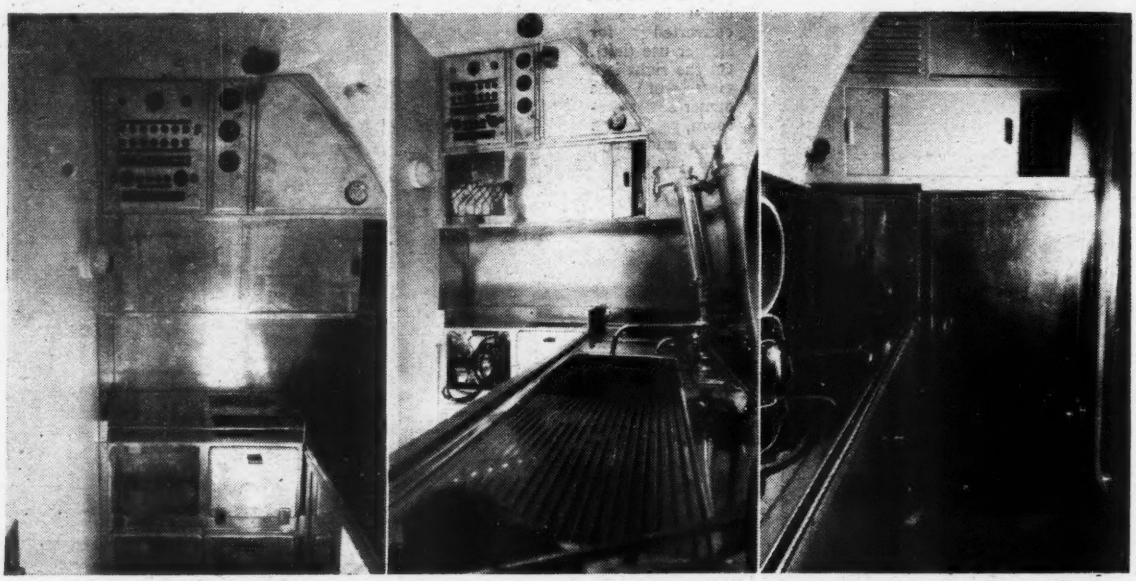
Menus a good deal more complicated than those obtainable in wartime restaurants could be produced with the help of the special galley equipment, which was capable of providing food for twenty people. This equipment was developed by G.E.C. as a result of experience gained in an Avro York which was previously used by Mr. Churchill. It consists of a grill-boiler with a heating element common to the hot-plate and grill, a deflector-plate being used to apportion the heat; a two-compartment hot-cupboard lagged with Idaglass; a water boiler with a draw-off capacity of two gallons; and a refrigerator. The cooker weighs only 21 lb. and the hot-cupboard only 23½ lb.

Domestic Signalling

Another feature of the aircraft is the G.E.C. luminous call system, which provides a preliminary audible signal and a visual indication which is continuous until it is cancelled by the steward. Electric fans of a specially compact and adjustable type were installed in the various cabins, the galley and the cockpit, while others could be used to circulate cool air through the heating system when the aircraft was on the ground.

One of the more striking modifications was that carried out to the heating and ventilating system. When the Skymaster arrived it was already fitted with a Janitrol heater mounted in the roof, with a supply trunk running rearwards. New extensions were laid along each side of the aircraft floor, that on the starboard side being extended to encompass the owner's stateroom. The original roof duct was then used as an air-extractor.

ANGLO-AMERICAN SKYMASTER



Below stairs : Views of the G.E.C. equipped kitchen. On the left is the cooker and plate rack ; in the centre is the "sink" ; and on the right is the special refrigerator. The quite complicated control and call system panel can be seen.

As might be expected, considerable alterations were necessary in the electrical installation. When airborne, power was obtained from the aircraft's generator system, but when on the ground the supply was taken from an auxiliary Andover power unit.

The water supply is taken from a twenty-gallon tank mounted in the galley ceiling, with a filter to provide drinking water; there are thermostatically controlled storage heaters for the owner's and passengers' toilet and an urn heater in the galley.

In order to supply sufficient oxygen for the passengers, three additional low-pressure cylinders were added to the existing system, with regulators for day and night use in the passenger cabin, in the conference room, and the owner's stateroom. The available supply was sufficient to keep a crew of six, and ten passengers, supplied during four hours' flying at 20,000ft.

Emergency possibilities were, of course, carefully considered, and two complete sets of equipment, each including a dinghy, were provided. Five different means of emergency exit were available: the forward door, which opens inwards; the forward portion of the main entrance door, which could be jettisoned; and a removable window in each of the three passenger cabins.

The weight of the various alterations, furnishings and special equipment totalled 6,390 lb., which, with 990 lb. to cover the emergency gear and catering equipment, gave a basic operational weight of 44,680 lb. for the Skymaster. Fuel and oil for approximately 4,000 miles totalled 24,030 lb., and an allowance of 1,380 lb. for the crew and their baggage left a "payload," at maximum range, of 2,901 lb.

This remarkable aircraft has since been flown back to America.

SIDNEY ALBERT DISMORE

THE death of Group Capt. S. A. Dismore, on November 15th, at the early age of 45, deprives air transport of one of its pioneers. His life had been devoted to commercial aviation, and he had made an outstanding contribution to its progress.

Dismore learned to fly during the first world war, and on demobilisation he remained in the Reserve and became secretary of Handley-Page Transport, one of the four pioneer companies which were merged, in 1924, to form Imperial Airways.

In the new company he later became assistant general manager. His special gifts led him naturally to specialise on, and be entrusted with, the financial aspects of air transport and with the preparation of estimates for the operation of new services. In addition, he dealt with the insurance of the aircraft. In such matters he acquired, as the result of wide experience, exceptional keenness and natural ability, an unrivalled knowledge. On him fell the very heavy responsibility of scheming out the financial implications of each of the Empire air routes, from the Cairo-Baghdad service in 1926 to the experimental trans-Atlantic flights of 1937.

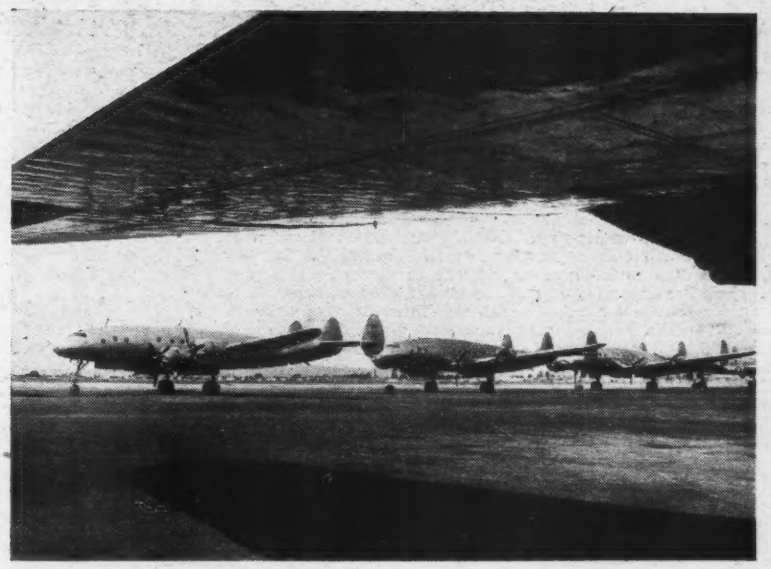
His most outstanding contribution to British air transport was undoubtedly the proposal that all first-class Empire mail should be carried by air without surcharge. The proposals needed only to be enunciated with supporting evidence of practicability to be immediately and wholeheartedly adopted. Although many brains contributed to the ultimate plans, to Dismore must go the credit for originating the idea. After the scheme had been adopted in principle by the Government, Dismore visited Australia and New Zealand, and it can be said that his wide knowledge, enthusiasm and gift of lucid exposition materially helped to establish and cement a relationship between the various operating companies.

The agitation against Imperial Airways in 1937 which culminated in the Cadman Committee Enquiry and the subsequent amalgamation of Imperial and British Airways came to him as a shock and disappointment from which he never recovered. Although he remained with B.O.A.C. as Director of Finance for two years after its formation, he was never happy in the new régime. Soon after the outbreak of war he joined the R.A.F. as a flight lieutenant, and was loaned to M.A.P. for work in connection with the delivery of bombers across the Atlantic.

Group Capt. Dismore was on demobilisation leave at the time of his death, and his loss will be felt not only by his old colleagues, but also by his friends in Transport Command. He was fearless and uncompromising in what he believed to be right, full of energy, determination and drive, and a loyal and co-operative colleague. Civil aviation can ill afford to lose such a man.

H. B.

CIVIL AVIATION NEWS



ON THE MOVE: Lockheeds are rapidly switching over to peacetime production and have received very useful orders for Constellations. Maybe, in a year or two, we shall be able to compete on more than level terms with American civil production.

A.R.B. NOTICES

THE gradual return of normal conditions is exemplified by the issue of the new series of Notices to Aircraft Engineers and Owners which are now being made by the Air Registration Board. Numbers 4 to 8 of this series, covering airscrews, aircraft markings, airworthiness requirements and radio have recently appeared.

FRANCE'S ATLANTIC

M. RENE BRIEND, the vice-president of Air France, on his return from the I.A.T.A. conference, has stated that negotiations are in progress between his company and the Governments of both Eire and Portugal with reference to the establishment of a trans-Atlantic service.

Air France hopes to start the service in January, but no definite decision has yet been made in the matter of route. Air France has, incidentally, placed orders for both Douglas Skymasters and Lockheed Constellations.

DE HAVILLAND ORPHANS

YET another unfortunate effect of the war is that many manufacturers have been unable to make spares for their pre-war civil types. In the rush and hubbub of war production jigs, tools, patterns, and in some cases even drawings, have been destroyed. The position is particularly sad in the case of the many pre-war de Havilland types, since a number of these are still serviceable and flying.

But the existing stocks of spares have been used in keeping these in the air during the war years, and ten de Havilland types must now be looked upon as orphans. These are (using the best-known type number or name, as the case may be): the Moth (D.H.60 X, G and M), Puss Moth, Fox Moth, Leopard Moth, Hornet Moth, Moth Minor, Dragon, D.H.86, Dragonfly and Flamingo. Engine spares are no longer available for the Gipsy Minor and the Gipsy Twelve. Some Tiger Moth fittings are, however, interchangeable with those of the 60G Moth, and Australian Dragons can still be served by the Sydney company.

THE B.O.A.C. HALIFAX TRANSPORTS

SINCE October 25th Handley Page Halifax VIII C transports have been experimentally used on the B.O.A.C. "dead load" service between this country and West Africa. Three services have been run every week on an *ad hoc* frequency basis at an average cruising speed of about 200 m.p.h. The VIIIs are now carrying most of the load once taken by Dakotas, thus leaving these rather more suitable aircraft for the use of passengers.

WASHINGTON TO BOMBAY

TRANS-CONTINENTAL and Western Air are planning to open a daily service between Washington and Bombay. Survey flights will shortly be made, and the service has been sanctioned by the U.S. Civil Aeronautics Board. No indication is given of the direction in which the flight will be made, though presumably the route will be via the Atlantic and Europe, since this will be both more practical and more useful.

OVERNIGHT TO GLASGOW

WHEN their Vickers Vikings are in service Scottish Airways are planning to start a night service between Glasgow and London. How the public will react remains to be seen, but certainly one of the bigger troubles of internal overland airline operations has been that surface travellers have usually been able to beat the airline handsomely by the simple expedient of taking a night train. If night air services become a commonplace some of the more competitive internal services may be used more freely.

THE FIRST SANDRINGHAM

THE first of the new Sandringham series of Short flying boats—described in *Flight* of July 19th this year—was due to be launched at Rochester yesterday. The Sandringham is virtually a civil development of the Sunderland and has a designed cruising speed of 199 m.p.h. at 4,750ft., with a range of 1,578 miles. Though smaller than the Empire boat, the Sandringham can accommodate more passengers—twenty-four by day and sixteen by night. The normal all-up weight is 52,980 lb. with a maximum of 56,000 lb.—which leaves a payload of 8,197 lb.

SOUTH PACIFIC SERVICES

ROYAL NEW ZEALAND AIR FORCE crews, using Dakotas and Sunderlands, have for some time been operating services between Auckland and the various groups of islands in the South Pacific. The basis of the services is the 8,000-mile round trip, via New Caledonia, New Hebrides, Fiji, Tonga, Samoa, the Cook group of islands, and return, which is covered in ten days, including a two-day "rest" at Rarotonga in the Cook group. This service is now being operated once a fortnight. The Sunderlands are used on a separate service between Auckland and Suva.

Meanwhile, Qantas Empire Airways are operating special flying-boat services from Sydney to Suva. The Empire boat *Coriolanus* was scheduled to leave Rose Bay last Saturday. The run to Suva will occupy two days, calling at Brisbane, and stopping overnight at Noumea, New Caledonia. Two services are being operated at the request of the Fijian and Australian Governments to relieve passenger congestion in Suva.

P.I.C.A.O. APPOINTMENTS

THE Interim Council of the Provisional International Civil Aviation Organisation has approved the appointment of Mr. Ivor H. McClure as Assistant Secretary General for Air Navigation, with Mr. E. A. Westlake as chief of the Air Traffic Control Section and Colonel G. R. Nichols for the Communications Section. Mr. McClure has been director of Operational

CIVIL AVIATION NEWS

Services and Intelligence in the British Directorate of Civil Aviation since 1937 and an early amateur pilot. Mr. Westlake has been in the Traffic Control section of the American C.A.A., and Colonel Nichols was commanding officer of a U.S. Pacific Airways Communications Group before joining C.A.A.

P.I.C.A.O. has decided to ask the Eire Government to call a conference of those nations interested in North Atlantic services. This meeting will probably be held in March next year. The Air Navigation Committee has advocated the preparation of a multi-language glossary of aeronautical terms, English, French and Spanish to be used in the first issue. The same committee has asked a sub-committee to record all important specifications—e.g., in the case of traffic control, where the choice of unit has clear operational significance—in both metric and English units. P.I.C.A.O. is also to publish a "bibliography" of publications relating to air navigation procedure.

AUSTRALIA TO MANILA

AT the request of, and under charter to, the American Government, Australian National Airways have opened up a service between Brisbane and Manila, in the Philippines. Two aircraft will leave each of the terminals daily, but the service is at present reserved for freight and urgent official passengers.

CHINA NATIONAL AVIATION RESUMES

ONE of the two major airline concerns operating in China before the war, China National Airways, has recently restarted an air service between Hong Kong, Canton, Shanghai, and Chungking. Kaitak airfield, Hong Kong, can now be used and passages may be booked in the ordinary way.

AUSTRALIA-U.S.?

FOLLOWING the announcement that a U.S. air service across the Pacific to Australia is expected to be started next year, the Federal Government is to consider proposals for an agreement to obtain reciprocal landing rights.

AMATEURS FLY IN CANADA

THE Toronto Flying Club has purchased fourteen D.H. Tiger Moths, and have ordered three twin-engined Cessna Cranes from the War Assets Corporation. A number of the original twenty-three Canadian clubs have already started post-war operations with surplus Tiger Moths.

A volunteer interim Air Force is being established by the Canadian Government for use between now and September 30, 1947, by which time the size of the permanent R.C.A.F. will have been determined.

The Royal Canadian Flying Clubs Association has, incidentally, engaged Grp. Capt. G. Welstead as secretary-manager of the organisation. This Association is handling all purchases of war surplus aircraft for club use.

PAN-AMERICAN SPEED-UP

THE relief crews for the operation of Pan-American Airways' Douglas Skymasters on the trans-Atlantic route recently arrived at Rineanna. Previously the overall time for the round trip was 72 hours owing to the need for resting the crews; now the relief crews will, after routine maintenance, take over at Rineanna, cutting the overall time for the trip to 44 hours. On the new schedule P.A.A. will operate four round trips between New York and Rineanna.

Trans-Continental and Western Airlines have announced that they will start their North Atlantic service, using Skymasters, on or about December 15.

I.A.T.A. DECISIONS

THE International Air Transport Association, which held its first annual meeting in October, unanimously adopted the principle of traffic conferences with respect to areas, or with respect to a route or routes, and approved the initial opening of such conferences for nine world areas. The conferences will be concerned with all international air traffic matters involving passengers, cargo and the handling of mail in their respective areas.

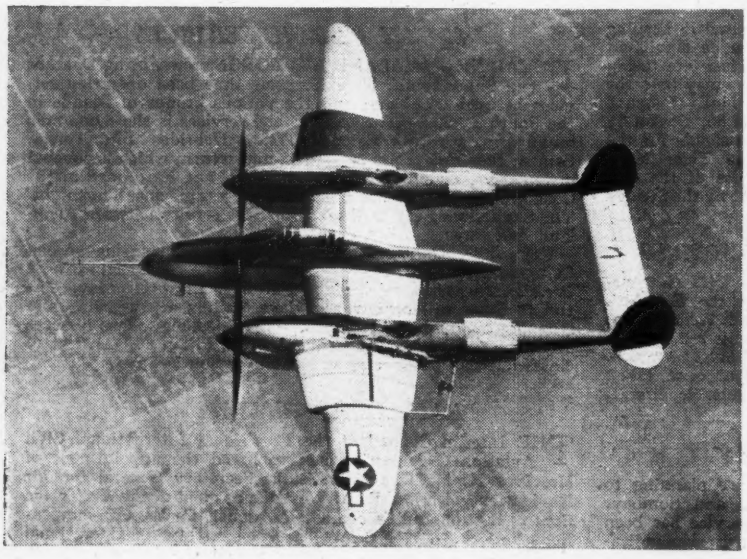
I.A.T.A. is composed of 57 leading airline companies, and its charter is a special Act of the Parliament of Canada, giving it a juridical personality. Dr. Hafex Aifif Pasha, of Misr. Air Lines, Egypt, was elected president for 1946. Until that time H. J. Symington, of Trans-Canada Airlines, remains as head of the international organisation. The 1946 meeting will be held in October in Cairo.

Theory in Practice

P-38 Specially Equipped for High-speed Aerofoil Tests

DETAILS of the Lightning Swordfish, a P-38 fighter converted in 1943 for testing wing forms at speeds in excess of 525 miles an hour, have been released by the Lockheed Aircraft Corporation.

Though such methods of research are not, of course, new, the completeness of the equipment in the Swordfish is noteworthy. The aircraft is distinguished by a five-foot yaw meter protruding from the nose, a technical observer's station abaft the pilot's cockpit, superimposed wing sections covering the wings between engine nacelles and ailerons, and vertical pitot-head combs behind the trailing edges to measure airflow.



The Lockheed P 38 Swordfish—so called because of the 5ft. yaw meter in the nose—flying with test aerofoils on the wings.

Envelopes, or false wings, covering a portion of the main wing have aerofoil forms in exact proportion to any experimental wing proposed. In flight the superimposed wing gives readings on the specially calibrated instruments exactly as would a full-scale wing.

In addition to the pitot combs behind the trailing edges, other and much smaller combs can be moved across wing surfaces to measure airflow. Pressure distribution through small holes in the wing envelope is used in calculating lift.

Instruments in the nose, automatically recorded by a ciné camera, plus additional cockpit instruments for visual observation during flight, provide records of each test made.

Although the Swordfish was originally developed to carry out dive tests on the P-38 Lightning, it has more recently tested proposed wings for aircraft ranging in size from fighters to transports.

Enterprise Honoured

Famous American Aircraft Carrier Receives Board of Admiralty Flag

ON Friday last the First Lord of the Admiralty, Mr. A. V. Alexander, the First Sea Lord, Admiral Cunningham, G.C.B., D.S.O., and the Fifth Sea Lord, Rear-Admiral T. H. Troubridge. C.B., D.S.O., accompanied by other Naval officers, were received on board the aircraft carrier U.S.S. *Enterprise* by Admiral H. Kent Hewitt, U.S.N., Commander of U.S. Naval Forces in Europe, and Capt. W. L. Rees, U.S.N., Captain of the ship. The occasion was the presentation of the Board of Admiralty Flag to the *Enterprise* in recognition of the splendid work of its crew and aircraft in the Pacific campaign.

The flag, with its gold anchor on a red base, made a brave splash of colour against a grey November sky as it flew from the main. On the flying deck, immediately below the halyards, the First Lord recounted some of the deeds of the ship, and suggested that the *Enterprise* should take the same place in the affections of the American people as that held by H.M.S. *Victory* in Britain. He pointed out that the Board of Admiralty Flag was first flown in the year 1570 and was carried by Lord Howard of Effingham against the Spanish Armada.

First Sea Lord's Tribute

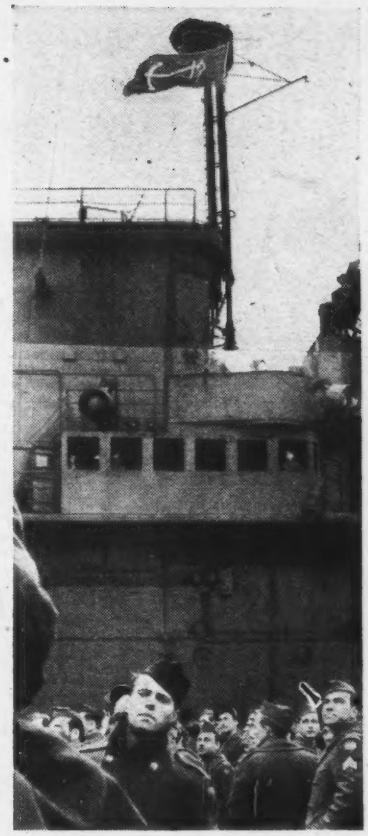
Lord Cunningham identified the *Enterprise* as the "Fighting Lady" in the epic film of that name. He wrote, he said, a foreword for that film and a picture of himself appeared on the screen. He was certain that this led many people to think he had commanded the ship—an impression which would have pleased him had it actually happened.

There is no doubt that the honour was gratefully received, but the U.S. Navy—if in this respect only—is even more silent than our own. Cheering is forbidden.

The *Enterprise*, which is now one of 15 U.S.N. combatant ships busily engaged on repatriation of troops, is but a shell of its former self. Gone are all the guns which once tackled Japanese suicide bombers The hangar deck now houses tier after tier of bunks for G.I.s

During the war the ship has had a variety of names—all of them deserved. For example, "Big E," because E stands for excellence in the U.S. Navy, and also because at one time a recognition E was painted on her decks. Then Admiral Halsey, U.S.N. Commander of the U.S. Third Fleet, nicknamed her "The Galloping Ghost" when he flew his flag in her during the early raids into the Marshall Islands. For security purposes in the film she rejoiced in the name of "Fighting Lady."

Mr. A. V. Alexander is received on the flight deck of U.S.S. *Enterprise*.

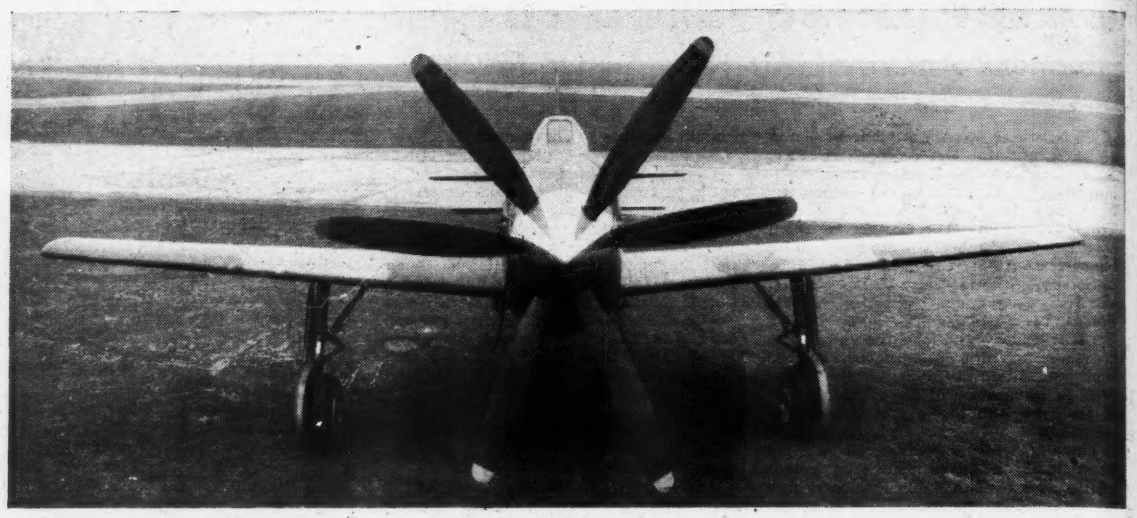


(Above) The newly presented flag flies from the main. (Left) Rear Admiral Troubridge, representing the British Naval Air Arm, watches the ceremony

In nearly four years of war the enemy damaged her no fewer than 15 times. On six occasions the Japanese claimed to have sunk her. Her official game bag includes 911 Japanese aircraft shot down by the ship's guns and aircraft; 71 enemy ships sunk by her aircrews, and another 192 damaged. In her final engagement at Okinawa, where six British carriers were also operating, *Enterprise* was hit four times. The last was by a heavily loaded suicide bomber which hit the forward end of the flying deck. The forward aircraft lift was blown 400ft. into the air. Painted on the bulkhead of the hangar deck is a Presidential Unit Citation for the first year of her war service. It reads:—

> "For consistently outstanding performance and distinguished achievement during repeated action against enemy Japanese forces in the Pacific war area, December 7, 1941, to November 15, 1942. Participating in nearly every major carrier engagement in the first year of the war, the *Enterprise* and her air group, exclusive of her far-flung destruction of hostile shore installations throughout the battle area, did sink or damage, on her own, a total of 35 Japanese vessels and shoot down a total of 185 Japanese aircraft. Her aggressive spirit and superb combat efficiency are fitting tribute to the officers and men who so gallantly established her as an ahead bulwark in defence of the American nation."

She is the sixth U.S. Navy ship to be named *Enterprise*, has a displacement of 27,000 tons, and was originally designed to carry 76 aircraft.



The Martin-Baker M-B V

Low Weight, High Power and Good Design Skilfully Combined : Exceptional Accessibility Facilitates Maintenance

AMONG the minor mysteries of the war are the reasons why the Martin-Baker fighter, the M-B V, was not adopted and put into production. It has many admirable features. The answer can hardly be that it arrived too late, for it made its first test flight from Harwell Airfield on May 23rd, 1944, so there should have been ample opportunity to get it through any initial teething troubles which might have been expected in a new type. As it is, Mr. L. B. Greensted, Rotol's chief test pilot, has done some 75 hours' test flying on the prototype, and we believe we are correct in saying that the machine has given no mechanical trouble in that time. It nearly came to an untimely end at the Farnborough demonstration recently, when a broken piston filled the cockpit with fumes and compelled Mr. Greensted to jettison the hood while doing some 400 m.p.h. His arm nearly followed the hood, and he strained a shoulder muscle. Nevertheless, he managed to make a safe forced landing on the runway, a remarkably good effort in the circumstances.

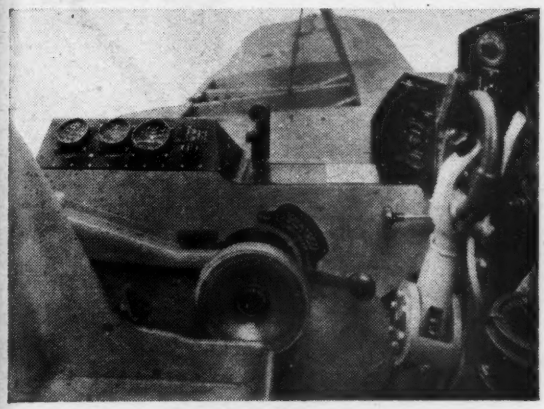
Pretty and Practical

The sleek lines of the machine came in for a good deal of comment at Farnborough. In the main, these may may be said to have been made possible by placing the radiators under the belly of the fuselage below and aft of the cockpit. This position leaves the fuselage nose very clean and slim, and the long spinner over the hubs of the contra-rotating airscrew carries the lines almost to a point. The only break in the lines under the nose is formed by the very long air intake to the carburettor. This extends up to the spinner, and is an integral part of the engine cowling.

The placing of the radiators aft under the belly results in a very clean nose. The air intake for the carburetter is extended up to the spinner.

Of importance in air fighting is the fact that the pilot's seat is well forward, and gives an excellent view over the nose and leading edge of the wings. A special feature is that the pilot has a gun-sight angle of 9½ deg., which is suitable for the gyro gun-sight. The armament of the M-B V comprises

THE MARTIN-BAKER M-B V

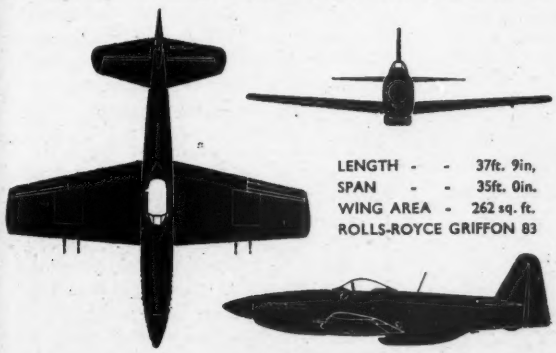


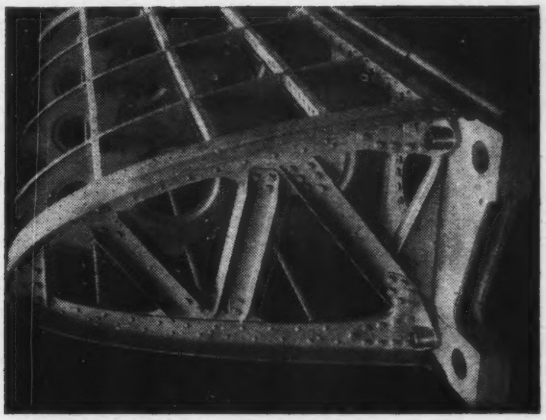
Tidiness and convenience have been specially considered in the cockpit layout. This view of the port side shows the fore-and-aft trimming wheel, the undercarriage selector lever, the throttle and airscrew control, and the pneumatic pressure gauges for the brakes, undercarriage and flaps.

four 20 mm. cannon, and the machine carries 200 rounds of ammunition for each. In addition, the fuel tankage is more than 200 gallons (giving quite an extended range at cruising speed), so that the fact that the loaded weight is only 11,500 lb. appears to indicate a very low structure weight.

We have frequently mentioned the advantage, in a small aircraft, of the girder-type of fuselage as compared with the stressed-skin shell. Evidently Mr. J. Martin, chief designer and managing director of Martin-Baker, is of the same opinion. The M-B V has such a fuselage, and the covering is in large removable panels which make not only installation of equipment easy but greatly facilitate maintenance and servicing afterwards.

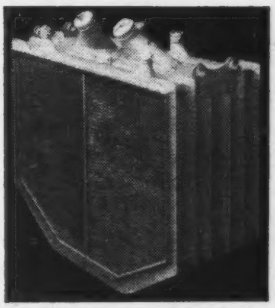
The wing is of the single-spar type, with the spar and leading edge forming a torsion box. The details of the wing primary structure are simple and straightforward. The flying controls are operated by torsion bars, which make for light control.





The wing is of the single-spar type, with the leading edge forming a torsion box.

Three radiators are grouped together in the M-B V. The front is the inter-cooler, the next the main cooler, and the rear one the oil cooler.

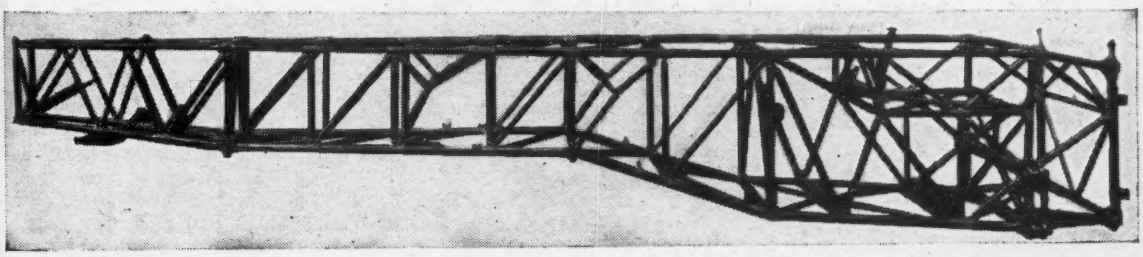


An undercarriage of very wide track is fitted, the wheels retracting inwards. Operation is by compressed air, and has been found entirely trouble-free. The tailwheel also retracts.

In the pilot's cockpit the controls and instruments are arranged in very convenient positions, no contortion of the pilot's body being necessary in order to reach any of the controls. The construction of the instrument panel is somewhat novel. A sub-frame (which has the stiffness necessary to make it a part of the structure) carries three swinging panels which open outwards to give instant accessibility to any of the instruments. The hood, of "teardrop" form, has three-point suspension and can, as has been demonstrated, be jettisoned.

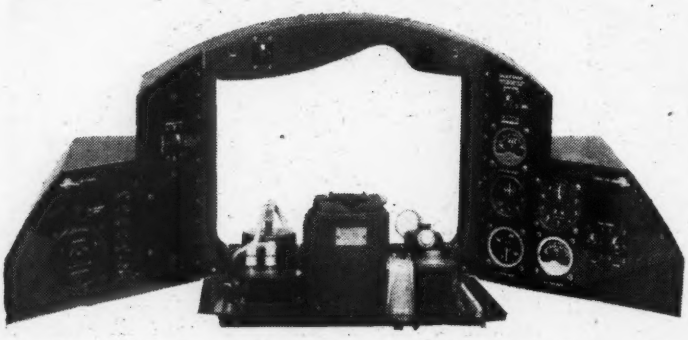
The engine of the M-B V is a Rolls-Royce Griffon 83, Basically this is identical with the engine fitted in the Spitfire 14 and 21, but with the important difference that, whereas the latter drive five-bladed single airscrews, the 83 drives contra-rotating "double-threes." The gears by which this is accomplished are shown diagrammatically and in section in one of our illustrations.

The modification to the reduction gear to make it suitable for contra-rotation did not entail major alterations to the front of the engine. The airscrew shafts

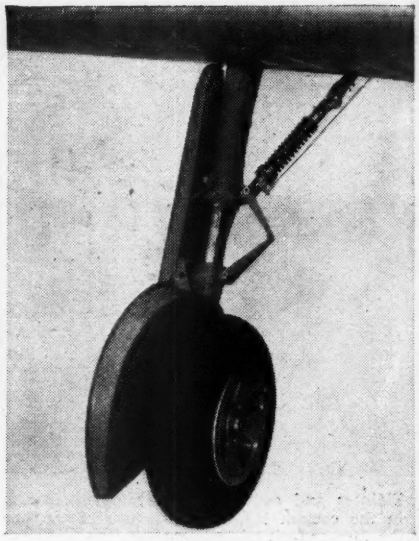


Primary structure of the M-B V fuselage is of the girder type. Large detachable panels give good accessibility.

THE MARTIN-BAKER M-B V

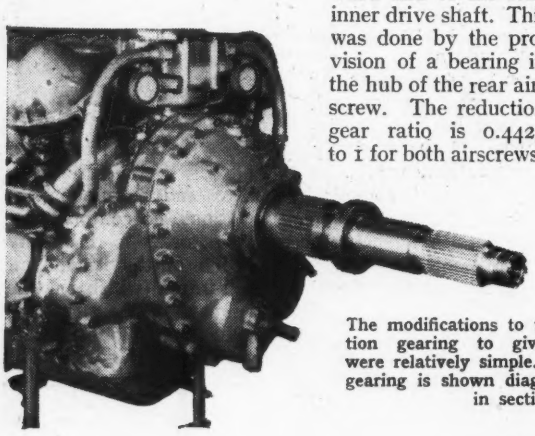


All three instrument panels can be lowered forward for access to the instruments. In this picture the blind-flying panel is shown lowered.

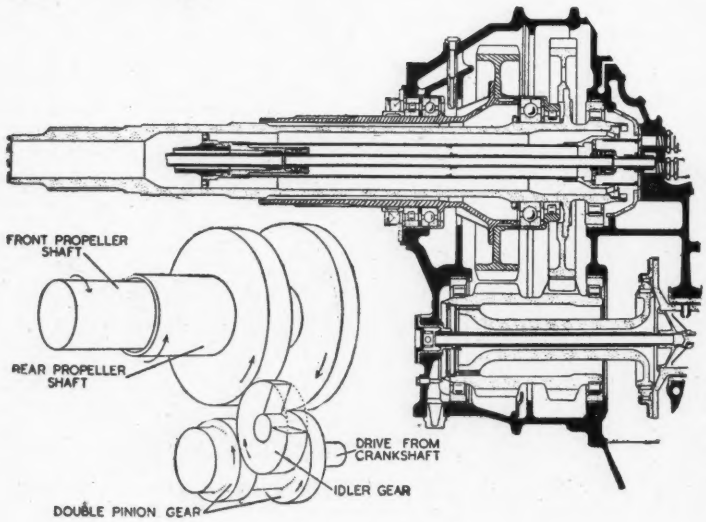


The wide-track undercarriage of the M-B V is operated by compressed air. The system has proved very reliable.

are mounted co-axially, the drive shaft for the front airscrew passing through the drive shaft for the rear airscrew. The fitting of the thrust bearings and location of the shafts in the reduction gear casing is the standard arrangement for Rolls-Royce reduction gears, but provision had to be made for locating the forward end of the long inner drive shaft. This was done by the provision of a bearing in the hub of the rear airscrew. The reduction gear ratio is 0.4423 to 1 for both airscrews.



The modifications to the Griffon reduction gearing to give contra-rotation were relatively simple. Below, the new gearing is shown diagrammatically and in section.



By using contra-rotating airscrews a greater take-off power can be used, as there is no swing, and performance at altitude is improved. The Griffon 83 has been cleared for a maximum boost of +25 lb./sq. in., and has a power rating of 2,340 b.h.p. in M.S. gear and 2,120 b.h.p. at 12,250ft. in F.S. gear. A Rolls-Royce Bendix Stromberg injection carburettor is used.

In connection with the cooling of the Griffon as installed in the M-B V it may be mentioned that the three radiators are placed one behind the other. First comes the intercooler, then the main cooler, and at the back the oil cooler. This unusual arrangement has the advantage that, when warming-up, the heat from the main radiator prevents coring of the oil, and full oil pressure is obtainable within a few minutes of starting-up.

The air intake, as already mentioned, extends forward to the airscrew spinner. Vertical "splitters" are fitted throughout its length to ensure stiffness and also to reduce turbulence. On actual test this air intake has proved so effective that it added 5,000ft. to the supercharge of the engine.

Spectacular Climb

Performance figures for the M-B V may not be quoted, but anyone who has seen the machine fly will agree that it looks impressive. The climb in particular, thanks to the 25 lb. boost of the Griffon, is startling, notwithstanding the fact that the wing loading is 44 lb./sq. ft. This high loading is, of course, accompanied by a very low power loading, viz., 5 lb./b.h.p., so that the combined loading (wing loading multiplied by power loading) is only 220.

The Martin-Baker M-B V is not the first fighter designed and built by the firm. A very unorthodox machine was produced some years before the war, designed mainly for ease of production. During the war there followed the M-B III, which had a Napier Sabre engine and a speed of 430 m.ph. at 20,000ft.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

CAMPAIGN AWARDS

More Ungenerous Treatment

IN many issues of *Flight* I have read letters regarding recognition of instructors. Although two wrongs don't make a right I am tempted to quote my own case.

Putting in three years' flying pre-war in Class F Reserve and the V.R. I was mobilised when war started and flew continuously for the six war years without break, putting in 2,600 hours. A variety of jobs ranged from fighter flying on an aircraft carrier in 1939 to Liberator captain from 1943 to 1945, and included three years as flying instructor to Fleet Air Arm and R.A.F. pilots on single, twin and 4-engine aircraft.

Operations were done in the Far East, and our squadron lost seven out of a normal quota of 16 crews, yet the work was considered unworthy of any recognition—a squadron record, I think.

On demobilisation my log books with nine years' flying were taken from me under cabled threat of stoppage of pay or recall. My log books cannot now be traced officially and I get no awards whatsoever, not even the Defence Medal.

Moreover, more important to me, I am unable as things stand to renew my B licence or get a navigation licence.

EX F/LT.

[Our correspondent's case would probably interest the R.A.F. Association or the British Legion.—ED.]

PASSENGERS' VIEWS

High-wing Types Favoured

AS a regular reader of *Flight* and a person who does a certain amount of travel by air, may I write a word or two regarding one aspect of aircraft design which is brought forcibly to the attention of the air traveller?

The aspect is passengers' visibility from the aircraft.

I have just been reading the descriptions of the Vickers Viking and the D.H. Dove. All seems very nice, but no mention is made of the fact that from most of the windows the only view is that of a dazzlingly shiny vista of wing. This criticism applies, of course, to all low-wing machines.

It is no use saying the passengers do not want to see downward. As proof that they do, one has only to watch the scramble for the back seats on the average Hudson or Dakota when passengers board them for the second or third day of a long route, by which time they have realised that it is only from the seats right behind the wings that any downward view is obtainable. I have experienced this on trips between Cape Town and here, and on other African routes.

In the York, the flying boats, and the old Flamingo it is a joy to sit beneath the wings, with an unobstructed downward view, and the sky glare cut off, especially in the tropics.

There can be no doubt that from the passenger's point of view the high wing will be the more popular, and it is a point the manufacturers and operators might watch. On routes with a choice of the two types I know which will be the more popular, especially with passengers not on their first flight.

The Airspeed Ambassador is on the right lines, and I venture to prophesy that it will be a more popular machine than the modern American low-wing aircraft.

J. M. SLEIGH, B.Sc., M.I.C.E.

NATIONALISED AIRWAYS

Operation Costs Should be Lower

I WAS somewhat surprised to see T. F. Feverheerd's letter in *Flight*, November 15th. To me, his policy seems to be to pitch his modest effort against that of the State—to *obstruct* the State. And to fight the State nowadays is to fight oneself; you, Mr. Feverheerd, are the State; so am I. This is England.

The seats of utility buses were designed, as their name implies, for wartime utility. There is no reason why we should not travel in comfort in National Airways' aircraft; it depends on the Government's attitude to their passengers.

What of the fares? he asks. What of them? They ought to go down; they certainly cannot go up. And the officials, I most profoundly hope, will be polite and helpful. They will not be ordinary civil servants. They will, I suppose, be more like railway clerks than food office clerks. Does it make any difference to them that they belong to a publicly owned airline instead of a private one? They will not be normal if it does.

And the railways, too. Will it not be to their own benefit if they run goods train services to and from busy airports? The same, of course, applies to the road services.

Nationalisation does offer advantages, although our correspondent friend does not seem to realise this. Under the new system, owing to the larger organisation, there will be less wastage. This, in turn, makes for lower running costs, lower fares and increased efficiency. There would be no need for this, that and the other Pilots' Guild for Old Crocks, surely.

The Government is now blessed with the power to give British civil aviation a flying start. It all depends on its attitude to the industry, which under a workers' government should be favourable, and on the co-operation of everyone, including Mr. Feverheerd.

This is no time for mournful attitudes to what cannot be prevented; it is a time for us all to work together to improve and go on improving.

Surely in a democratic country like our own the air-minded public can get things done, and get their wishes fulfilled. It has been done before; it can be done again—in England, now.

D. HAYNES.

TWIN TRAINERS

"Indicator's" View is Supported

YOUR correspondent "Ulysses" (*Flight*, November 15th) makes several misstatements which should be corrected:—

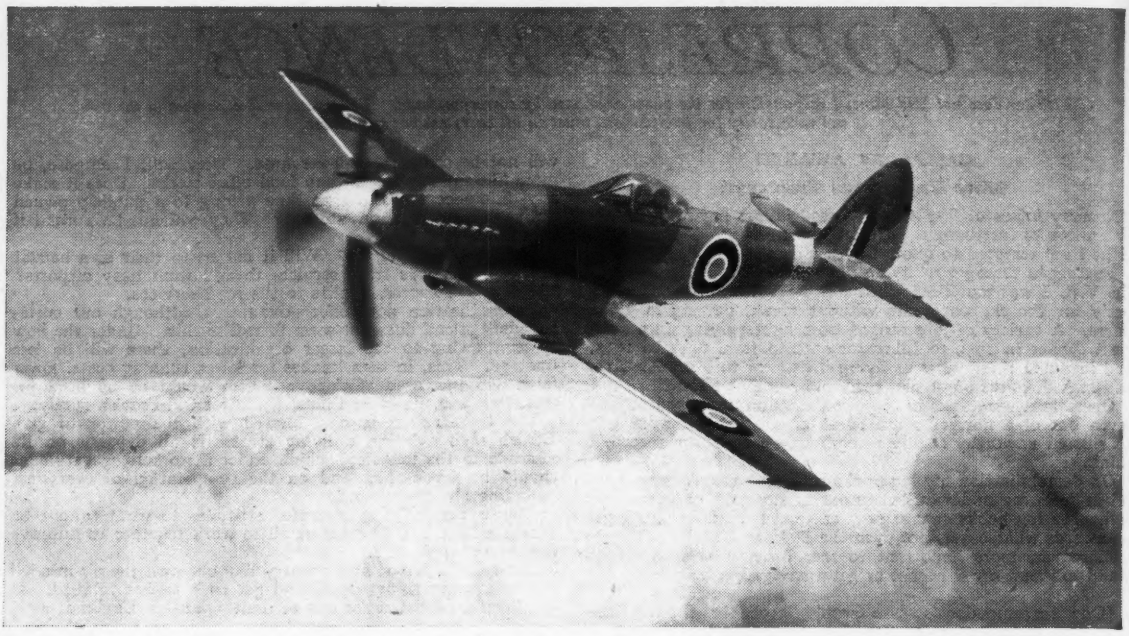
1. In Canada it was not "common practice" to correct a swing on landing in a twin engined aircraft by using the inside engine. Perhaps "Ulysses" has not yet read and applied the information contained at top of page 89 in the Instructors' Handbook of Advanced Flying Training!
   In other words, "Indicator" was dead right.
2. If, as your correspondent suggests, three-point landings were taught but not practised, then the reasons are more likely to be as follows:—
   (*a*) an extremely amateurish demonstration of the three-pointer was given;
   (*b*) pilots probably did give a "vigorous tug" on the stick, thereby ruining any chance of a decent landing;
   (*c*) there was bags of runway, so the instructors just got lazy.

The writer is entirely familiar with the high wind conditions experienced in Canada and is alive to the fact that extensive use has been made of runways which were often out of wind. In spite of this the contention is that a pilot who cannot three-point the "Oxford" is deficient in his knowledge of the particular handling qualities of the aircraft concerned. This leads on to the question of stalling characteristics. How a pilot can be entirely familiar with the feel of the aircraft during the stall (under various conditions) and still not be able to carry out a three-point landing on that particular type of trainer, is beyond comprehension. Or did "Ulysses" bother about such *unimportant* things as stalling or flying the aircraft to its limit?

3. There has never been any insistence upon three-point landings under all conditions—any self-respecting instructor will confirm this, and again, if "Ulysses" can spare the time, AP1732B refers.
4. It has been explained to pupils for years now that flaps should be used intelligently—as required by circumstances, weather conditions, etc. No hard and fast rule exists.
5. In view of "Ulysses'" limited flying experience I am willing at any time, any place, to fly with him (in spite of the fact that my better judgment tells me I shouldn't) and show him how to land the "Oxford" on three points with one hand, no tugging, no pulling, no rush, no bother, no fee—and at the same time I'll throw in a lesson on cross-wind landings just to straighten out any little points of doubt.
6. If his memory can go back a couple of years or so, perhaps "Ulysses" will remember his instructor telling him why we teach three-pointers in the early stages. If trained on singles or cannot remember, refer to AP1732B again!

Before writing again "Ulysses" would do well to put in a couple of months on his Service publications; perhaps then he would know a few of the answers.

"AYEONE"



SPITEFUL—BUT DELIGHTFUL : The trend of modern fighter design is well illustrated by the Spiteful, which, despite the severe plan form of the wings, possesses beautifully sleek lines.

SERVICE AVIATION

Royal Air Force and Naval Air Arm News and Announcements

New Air Aide-de-Camp

GROUP CAPT. (Act. Air Comdre.) O. W. De Putron is appointed Additional Air Aide-de-Camp to The King in succession to the late Group Capt. (Act. Air Cmdre.) S. H. Hardy, C.B.E. Nov. 1st, 1945.

Awards

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations :—

Bar to Distinguished Service Order

Act. Wing Cdr. K. H. P. BEAUCHAMP, D.S.O., D.F.C., R.A.F.O., No 157 Sqn.—Wing Cdr. Beauchamp has completed three tours of operational duty. He has taken part in many operations since the award of the D.S.O. In November, 1944, he destroyed an enemy aircraft at Handorf, and in December, 1944, during a patrol near Coblenz he sighted another enemy aircraft and pursued it through low cloud before attacking and setting it on fire. In all, this officer's squadron has destroyed 63 enemy aircraft. Wing Cdr. Beauchamp has at all times shown courage and devotion to duty of a high order.

Distinguished Service Order

Group Capt. W. H. KYLE, D.F.C., R.A.F.—Since commencing his operational career in November, 1940, this officer has proved to be a most capable and determined pilot and an inspiring leader of formation operations in daylight. On one occasion he completed a long weather reconnaissance and then made a most successful bombing attack on the seaplane base on the Island of Sylt. Since the award of the D.F.C. in 1941, Group Capt. Kyle assumed command of a Station which was operating the first Mosquito bomber squadron and was in the process of forming and training a second squadron of these aircraft. This officer's meticulous attention to detail, brilliant leadership in the air and inspiring example have been reflected in the outstanding successes achieved by the two squadrons under his command.

Acting Group Capt. D. H. BURNSIDE, D.F.C., R.A.F.O., No. 195 Sqn.—Group Capt. Burnside has operated in Iraq, Persia, India and Burma. Under his leadership his squadron has shown outstanding results which have been in a great measure due to this officer's determination and ability. He has led numerous operational missions and his coolness and devotion to duty in the face of the enemy have at all times set a fine example.

Act. Group Capt. S. P. COULSON, D.F.C., R.A.F., No. 582 Sqn.—As a squadron commander Group Capt. Coulson has displayed outstanding ability. He has done much fine work as a master bomber and target marker and excellent results have been obtained by his squadron. This officer has an impressive record of missions successfully completed and has at all times shown exceptional qualities of leadership and devotion to duty.

Act. Group Capt. P. W. JOHNSON, D.F.C., A.F.C., R.A.F.O., No. 97 Sqn.—This officer has been in command of his squadron since November, 1944, during which time the squadron has been employed on pathfinder duties. Since the award of the D.F.C. he has captained an aircraft on 16 sorties. The work which Group Capt. Johnson has accomplished in the air against the enemy has largely contributed to the successful completion of many missions and has set an inspiring example to the other crews in his squadron. He has followed up this excellent leadership in the air by displaying similar qualities on the ground, sparing no effort to bring his squadron up to its present high standard of operational efficiency.

Act. Group Capt. H. J. F. LE GOOD, D.F.C., A.F.C., R.A.F., No. 35 Sqn—As a squadron commander this officer has shown outstanding ability. He has also shown great keenness to fly with his squadron on all missions, frequently in the role of master bomber. Group Capt. Le Good has proved himself to be an outstanding operational leader who has displayed great courage and determination on all occasions.

Act. Wing Cdr. J. D. BOLTON, D.F.C., R.A.F.V.R., No. 162 Sqn.—Since the award of the D.F.C. this officer has taken part in many operational sorties. He has invariably displayed outstanding airmanship, courage and great determination. In December, 1944, Wing Cdr. Bolton assumed command of his present squadron, and under his splendid leadership many notable successes have been achieved.

Distinguished Flying Cross

F/O. W. R. GILHAM, R.A.F.V.R., No. 184 Sqn. (with effect from April 24th, 1945) (since deceased).

F/O. H. W. HAZELL, R.A.F.V.R., No. 101 Sqn. (with effect from January 13th, 1945) (since deceased).

F/O. W. KINDRED, R.A.F.V.R., No. 357 Sqn.
F/O. K. T. T. KING, R.A.F.V.R., No. 126 Sqn.
F/O. S. PARKES, R.A.F.V.R., No. 575 Sqn.
F/O. B. S. PEDLEY, R.A.F.V.R., No. 31 Sqn.
F/O. T. J. PHILLIPS, R.A.F.V.R., No. 151 Sqn.
F/O. D. R. PICKERING, R.A.F.V.R., No. 123 Sqn.
P/O. S. H. SEED, R.A.F., No. 357 Sqn.
P/O. W. A. SMITH, R.A.F.V.R., No. 117 Sqn.
W/O. G. E. BARTTER, R.A.F.V.R., No. 159 Sqn.
W/O. T. CARDWELL, R.A.F.V.R., No. 194 Sqn.
W/O. L. N. ELLIOTT, R.A.F.V.R., No. 357 Sqn.
W/O. T. H. GEARY, R.A.F., No. 159 Sqn.
W/O. F. V. T. LINEHAM, R.A.F.V.R., No. 357 Sqn.
W/O. J. B. ROUTLEDGE, R.A.F.V.R., No. 60 Sqn.
W/O. H. SELLARS, R.A.F.V.R., No. 45 Sqn.
Flt. Lt. L. W. FELTHAM, R.A.F.V.R., No. 127 Sqn.
Flt. Lt. L. S. FROST, R.A.F.V.R., No. 74 Sqn.
Flt. Lt. J. G. B. HARTLEY, R.A.F., No. 197 Sqn.
Flt. Lt. B. C. KELLY, R.A.F.V.R., No. 64 Sqn.
Flt. Lt. J. M. KEY, R.A.F.V.R., No. 247 Sqn.
Flt. Lt. G. S. LAWSON, R.A.F.V.R., No. 26 Sqn.
Flt. Lt. L. C. LUCKHOFF, R.A.F.V.R., No. 33 Sqn.
Flt. Lt. G. N. MANN, R.A.F.V.R., No. 274 Sqn.
Flt. Lt. D. C. MCNEIL, R.A.F.V.R., No. 21 Sqn.

Flt. Lt. R. S. Pritchard (left), and Flt. Lt. W. Gallagher, navigator and radio operator of Mr. Attlee's aircraft during his recent trip to the U.S.

SERVICE AVIATION

Flt. Lt. A. D. MERCER, R.A.F.V.R., No. 268 Sqn.
Flt. Lt. K. L. MONAGHAN, D.F.M., R.A.F.V.R., No. 487 (R.N.Z.A.F.) Sqn.
Flt. Lt. F. E. MOORE, R.A.F.V.R., No. 4 Film Production Unit.
Flt. Lt. M. J. S. MYCROFT, R.A.F.V.R., No. 349 Sqn.
Flt. Lt. R. C. NUTTER, R.A.F.V.R., No. 175 Sqn.
Flt. Lt. D. C. PARKER, R.A.F.V.R., No. 165 Sqn.
Flt. Lt. C. F. PONSFORD, R.A.F.V.R., No. 605 Sqn.
Flt. Lt. J. A. POTTER, R.A.F.V.R., No. 21 Sqn.
Sqn. Ldr. J. W. MALONEY, R.A.A.F., No. 117 Sqn.
Flt. Lt. K. BUCHANAN, R.A.A.F., No. 357 Sqn.
Flt. Lt. P. H. NISSEN, R.A.A.F., No. 194 Sqn.
Flt. Lt. H. E. ORCHARD, R.A.A.F., No. 117 Sqn.
Flt. Lt. J. R. ROSS, R.A.A.F., No. 486 Sqn.
Flt. Lt. S. J. SMITH, R.A.A.F., No. 159 Sqn.
F/O. R. E. J. MACDONALD, R.A.A.F., No. 152 Sqn.
F/O. J. E. OLLIFF, R.A.A.F., No. 123 Sqn.
F/O. D. G. ORCHARD, R.A.A.F., No. 117 Sqn.
P/O. F. V. ENTWISTLE, R.A.A.F., No. 681 Sqn.
P/O. A. L. SIDDONS, R.A.A.F., No. 194 Sqn.
W/O. J. E. FARRELL, R.A.A.F., No. 607 Sqn.
W/O. A. H. GORDON R.A.A.F., No. 194 Sqn.
Wing Cdr. T. P. HARNETT, R.C.A.F., No. 435 (R.C.A.F.) Sqn.
Act. Wing Cdr. R. A. GORDON, R.C.A.F., No. 436 (R.C.A.F.) Sqn.
Flt. Lt. J. G. ALDRICH, R.C.A.F., No. 31 Sqn.
Flt. Lt. G. S. L. ANDERSON, R.C.A.F., No. 436 (R.C.A.F.) Sqn.
Flt. Lt. H. H. BEAUPRE, R.C.A.F., No. 83 Sqn.
Flt. Lt. W. M. CARON, R.C.A.F., No. 357 Sqn.
Flt. Lt. C. FOLSOM, R.C.A.F., No. 436 (R.C.A.F.) Sqn.
Flt. Lt. J. D. LAMB, R.C.A.F., No. 357 Sqn.
Flt. Lt. G. MILLER, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Lt. R. OLDHAM, R.C.A.F.
Flt. Lt. W. E. ROLLS, R.C.A.F., No. 436 (R.C.A.F.) Sqn.
Flt. Lt. F. H. SPROULE, R.C.A.F., No. 42 Sqn.
Flt. Lt. F. F. WATSON, No. 194 Sqn.
Act. Flt. Lt. H. N. CUMING, R.C.A.F., No. 436 (R.C.A.F.) Sqn.
Act. Flt. Lt. J. A. KING, R.C.A.F., No. 357 Sqn.
Act. Flt. Lt. J. H. POAG, R.C.A.F., No. 159 Sqn.
F/O. P. ARDELINE, R.C.A.F., No. 152 Sqn.
F/O. C. S. H. CAMPBELL, R.C.A.F., No. 357 Sqn.

Distinguished Flying Medal

Flt. Sgt. (now W/O.2) A. B. CARLSON, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Sgt. J. D. DIXON, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
Flt. Sgt. F. O. FERTICH, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Flt. Sgt. K. A. HICKEY, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Flt. Sgt. V. S. DAWE, R.A.A.F., No. 142 Sqn.
Flt. Sgt. (now P/O.) D. M. DRURY, R.A.A.F., No. 7 Sqn.

Army

THE KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services:—

Distinguished Flying Cross

Maj. (temp.) P. GREENHALGH, Royal Regiment of Artillery.
Capt. (temp.) H. C. SALTER, Royal Regiment of Artillery.
Capt. (temp.) M. WAWN, Royal Regiment of Artillery.

Foreign Decorations

THE KING has been pleased to grant unrestricted permission for the wearing of the following decorations conferred in recognition of valuable services rendered in connection with the war:—

Conferred by the President of the United States of America

Legion of Merit

COMMANDER.

Air Vice-Marshal W. F. DICKSON, C.B., C.B.E., D.S.O., A.F.C.

OFFICER.

Group Capt. F. C. DAUBNEY.
Act. Group Capt. G. R. SCOTT-FARNIE, R.A.F.V.R.
Group Capt. F. W. WINTERBOTHAM, R.A.F.O.
Wing Cdr. N. H. DIMMOCK, A.F.C., R.A.F.V.R.

Silver Star

W/O.2 (C.S.M.) J. G. BROOKS, Army Air Corps.

Soldiers' Medal

L.A/C. H. W. MAY.

Conferred by the President of the United States of Brazil

National Order of the Southern Cross

GRAND CROSS.

Air Chief Marshal Sir A. T. HARRIS, G.C.B., O.B.E., A.F.C.

OFFICER.

Act. Wing Cdr. C. C. CALDER, D.S.O., D.F.C., R.A.F.V.R.
Act. Wing Cdr. A. J. L. CRAIG, D.S.O., D.F.C., R.A.F.V.R.
Act. Sqn. Ldr. R. M. B. CAIRNS, D.F.C., R.A.F.V.R.

Roll of Honour

Casualty Communiqué No. 552.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 205 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Sgt. L. C. Barker; Sgt. E. Gunner; Flt. Sgt. F. M. Hale; W/O. J. A. Haugh; Sgt. A. R. Lishman; Sgt. R. C. Russell; Sgt. J. V. Somers; Sgt. M. H. Steele; F/O. R. J. Watson; Flt. Sgt. F. Wood.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. E. J. D. Butler; F/O. D. H. Edwards; Sgt. J. B. Gascoigne; Sgt. L. Hands; Sgt. D. R. John; Flt. Sgt. K. Punyer.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. F. L. Dolamore, D.F.M.; F/O. B. R. Dwyer; F/O. D. L. Edwards; Sgt. R. Gill; Flt. Sgt. T. R. Gunn; Flt. Lt. D. D. Hall; Act. Flt. Lt. A. T. Hope-Robertson; Sgt. G. Johnson; Flt. Sgt. G. H. Jones; F/O. R. J. Kingham; F/O. J. P. McCarter; Flt. Sgt. R. S. Moore; F/O. A. A. Murray; Sgt. E. Neville; P/O. A. G. Thorne; Act. F/O. G. W. Woodward, D.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. A. F. Lavender.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. L. H. Smart; Sgt. L. F. Stillwell.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Sgt. W. K. J. Bartlett; P/O. P. C. Robson.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. J. K. Allan; Sgt. R. L. Bailey; Act. Sqn. Ldr. M. W. Hubble; Flt. Lt. R. A. Miller, D.F.C.

MISSING.—Flt. Sgt. C. Alexander; Flt. Sgt. K. Antcliffe; W/O. E. J. Baker; Sgt. A. D. Blakey; Sgt. B. Blythe; F/O. A. C. Cockcroft; Flt. Sgt. K. L. Dutton; W/O. K. Emery; F/O. W. T. H. Gale; Flt. Lt. W. H. H. Hanks; F/O. A. J. Harding; Flt. Sgt. N. Haynes; F/O. P. Ireland; Flt. Sgt. R. T. Jaques; Flt. Sgt. A. G. King; Sgt. G. A. Knowles; Flt. Lt. P. S. L. Laycock; W/O. G. C. K. Long; F/O. T. M. McCabe; P/O. E. H. Marlow; F/O. G. A. J. Morrison; W/O. J. I. Murray; Flt. Sgt. F. R. Orritt; Sgt. W. S. Philip; Sgt. D. J. Philpot; Flt. Sgt. I. J. A. Pidgen; Flt. Sgt. D. F. Poore; Flt. Lt. A. C. Pope; Flt. Sgt. W. Probert; Flt. Sgt. G. W. Ramsay; Flt. Sgt. T. Reynolds; Sgt. W. G. Reynolds; Sgt. W. F. Turner; F/O. V. G.

R.A.F. WAR COMMANDERS

Air Chief Marshal Sir Arthur Travers Harris

Caricature portrait by Hayden

IN ages to come students of the world war of 1939-1945 will link together the strategic bomber campaign and the name of Air Chief Marshal Sir Arthur Harris, G.C.B., O.B.E., A.F.C. - Sir Arthur *was* the bomber offensive. He has described a bomber attack as a very difficult operation. Such information as has been made public has given some crude idea as to just how difficult it must have been. The methods of Bomber Command went through various stages during the war, ever increasing in weight of attack and in effectiveness. Science greatly helped-on the steadily improving methods, from a rough-and-ready beginning up to the remarkably accurate delivery of enormous weights of explosives on to the targets in a surprisingly short space of time. The skill with which huge forces of heavy bombers were assembled from different bases in Great Britain to rendezvous over the target was a matter of excellent staff work, and when staff work is good the main credit may safely be allotted to the commander.

It was long before Sir Arthur Harris was able to concentrate the main energies of his Command on the destruction of German war production. Bomber Command must always be flexible, and must be prepared to help the efforts of Navy or Army at critical junctures. The long period of bombing attacks on the German warships in Brest, for instance, postponed the time when the full weight of the bombers could be brought regularly to bear on German production. Later, when the Army of Liberation landed in Normandy, Bomber Command was called on to give it tactical support. Despite everything, the campaign which was the proper work of the Command resulted in a mass of destruction in German industrial cities which had never been foreseen by either side at the beginning of hostilities. By comparison the German raid on Coventry was mild.

Sir Arthur Harris was born at Cheltenham in 1892. He began his military career by enlisting in a Rhodesian infantry battalion in 1914 and fighting in South and South West Africa. Next year he joined the R.F.C. as a 2nd Lieutenant and served in France, where he was awarded the Air Force Cross. In the inter-war years he completed courses at the Senior Officers' School, Sheerness, and the Army Staff College, Camberley. Then he held a number of R.A.F. posts, many of them on staffs, which must have prepared him for his subsequent great work as A.O.C.-in-C., Bomber Command. As we write, he lies in hospital with internal trouble, and all his friends and admirers will wish him a speedy return to robust health.

SERVICE AVIATION

Watling; Flt. Sgt. R. F. Watts; Sgt. J. Whittenbury; Flt. Lt. A. T. C. Wilmot-Dear; Flt. Sgt K. Woodhart; F/O. R. L. Young.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. R. W. McMillan.

KILLED ON ACTIVE SERVICE.—Sgt. A. Banks; L.A/C. J. T. Bowskill; Sgt. M. F. Brennan; F/O. C. F. Brown; Sgt. W. Callander; F/O. L. W. L. Davies; Flt. Sgt. D. G. Dennett; Sgt. V. P. Dias; Sgt. N. R. Drake; Sgt. J. B. Egan; Sgt. W. Gourlay; Sgt. A. G. Grant; Flt. Sgt. W. Gribbin; W/O. H. Harris; Flt. Sgt. W. J. Hillier; F/O. T. W. Jaspes; W/O. S. Jenkinson; P/O. A. R. Knight; Sgt. P. McGowan; Sgt. H. Mairs; F/O A. G. Matthews; Sgt. D. H. Millichamp; A/C.1 A. Noble; Flt. Sgt. E. K Pannett; Sgt. J. D. Pulham; Act. Sqn. Ldr. F. L. Ratcliffe; F/O. E. Rawlinson; F/O. W. R. Short.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. D. T. Bax; Flt. Sgt. A. G. Harbottle; P/O. W. Jones; Flt Sgt. F. Mockridge.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. J. E. Bedell; Sgt. R. A. Bembridge; L.A/C. F. G. Brown; Flt. Lt. C. J. Butler; Act. Flt. Lt. K. J. Chapman; F/O. C. Koder, D.F.C.; L.A/C. S. J Mitchell.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Cpl. L. B. McDowall.

DIED ON ACTIVE SERVICE.—Air Chief Marshal Sir C. S. Burnett, K.C.B., C.B.E., D.S.O.; L.A/C. P. C. Cordery; L.A/C. L. Ellis; Flt. Lt. H. L. Furnell; L.A/C. W. E. Mitchinson; F/O. R. T. A. Morris; L.A/C. H. W. Pettet; W/O. D. R. Terrington, D.F.M.; W/O. P. S. C. Thorne; L.A/C. E. S. Wilks.

Royal Australian Air Force

MISSING.—Act. F/O. T. H. Baulderstone; W/O H. K. Franklin; Flt. Sgt. J. W. Hill; F/O. R. B Livingstone; F/O. H. K. Pugh; P/O. G. H Topliff.

Royal Canadian Air Force

KILLED IN ACTION.—W/O. T. W. Fry; P/O. T. Hartnett; Flt. Lt. O. Lesesne; Flt. Sgt. G. F. Montgomery; Sgt. D. W. Newman; F/O. G. R. Nowell; Flt. Sgt. J. M. Pougnet; F/O. B. N. Reed; F/O. D. F. Ross; F/O. A. G. Scott.

MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. J. A. Campeau; F/O. R. H. Fisher; W/O. E. M. Hooker; Flt. Sgt. J. H. R. R. Ledoux.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sqn. Ldr. W. C. Ahrens; F/O. A. V. Batty; F/O. D. A. Butler; F/O. J. F. Dewar; F/O. R. W. Doidge; F/O. J. L. Eagleson; F/O. R. A. Gaskin; Flt. Lt. J. G. Gohl; P/O. K. W. Halden; P/O. L. H. Hogg; F/O. R. A. Johns; Flt. Lt. A. B. Newsome; Sqn. Ldr. W. H. Pentland, D.F.C.; F/O. G. Scott; P/O. D. A. Webb.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. K. I. Aalborg; Flt. Lt. C. S. Aistrop, A.F.C.; F/O. E. J. Allen; F/O. J. K. Anderson; P/O. T. L. Baker; Sqn. Ldr. K. A. Boomer, D.F.C.; Flt. Sgt. E. Borkowsky; P/O. R. H. Bowen; F/O. E. J. Brian; F/O. J. W. Burrows; P/O. R. E. Burton; P/O A. G. Campbell; F/O. J. C. Campbell; P/O. R. A. Campbell; P/O. R. M. J. Champagne; F/O. R. A. Charland; P/O. D. W. Clarke; P/O. A. I. Cohen; F/O. K. McR. Collins; Sgt. G. T. Cook; F/O. T. Culshaw; W/O. H. W. Davy, D.F.C.; P/O. J. F. De Cordoue; P/O. A. J. Doran; P/O. P. E. Driver; Flt. Lt. W J. Drope; P/O. G. R. Dyelle; Flt. Sgt. K. J. Edmison; Flt. St. R. F. Emerson; F/O. T. F. Fisher; F/O. M. H. Fleming; F/O. A. G Gamaby; /O. N. V. Gaulachi; Flt. Lt. N. Gibbons, D.F.C.; F/O. G. L. Gilbert; F/O. A R. Girolami; P/O. M. Gnida; P/O. J. H. E. Goldfinch; F/O. R. B. Gowan; F/O. J. P. Grace; P/O. F. A. Harrison, D.F.C.; P/O. R. B. Herger; P/O. J. D. Hogg; P/O. W. D. Huff; Flt. Lt. W. H. Janney; P/O. P. R. Jones; F/O. W. E. Jory; P/O. N. Joss; P/O. L. R. Kay; Sgt. J. W. C. Labelle; P/O. P. C. Lailey; F/O E. R. Lambert; P/O. W. O. D. Larmouth; Flt. Lt. J. G. Lee; P/O. T. E. Lee; F/O. J. Lindsay; F/O. H. J. Loughran; F/O. W. R. McCutcheon; F/O. J. K. MacDonnell; P/O. A. S. McFeetors; Sqn. Ldr. W. C. McGuffin, D.F.C.; F/O. L. A. McIntyre; F/O. P. E. McNamara; F/O. A. McNeill; P/O. F. G. Mallais; P/O. R. G. Manwell; Flt. Lt. R. F. Mead; F/O. R. Molloy; P/O. T. G. Morin; P/O. W. A. Morrill; F/O. H. J. Muir; P/O. E. Neufeld; P/O. R. T. Neville; Sgt. K. E. Odobas; Flt. Sgt. L. F. O'Hara; Flt. Sgt. W. W. Ozeroff; P/O. G. R. Pond; F/O. V. L. Riley; P/O. W. M. Ritchie; P/O. E. T Rivers; F/O. B. E. Roberts; P/O. C. E. Roberts; P/O. J. M. Ronahan; Flt. Sgt. L. Schaff; Flt Sgt. D. Shoobridge; P/O. R. A. Simpson; P/O. S. E. Smith; Flt. Lt. D. W. Speller; F/O. J. C. Sprott; Flt. Lt. A. C. Strout; F/O. J. N. R. Therreault; F/O. C. B. Thompson; P/O. J. K. Vivian; P/O. A. L. Wall; Flt. Lt. A. Wallace; F/O. L. C. E. Webley; P/O. A. J. Williamson; P/O. C. H. Woelfle; F/O. J. J. Wolfe; Flt. Lt. G. P. Wyse.

MISSING, BELIEVED KILLED IN ACTION.—F/O. R. W. Anderson; Flt. Lt. J. W. E. Earten; P/O. G. F. Peterson; Flt. Lt. N. P. C. Woodward.

MISSING.—F/O. R. R. A. Adrain; W/O. J. Bomby; Flt. Sgt. C. H. Booty; W/O. J. A. Buzza; Flt. Sgt. K. F. Chapman; Flt. Lt. H. Cowan; Flt. Sgt. W. J. Dunningan; P/O. R. C. Fletcher; F/O. H. R. Hanscom; F/O. A. A. Hawthorne; F/O. L. K. Jackson; P/O. I. W. Kelly; Flt. Sgt. R A. McDonald; Flt. Lt. L. E. Munro; Sgt. Le R. F. J. Murphy; F/O. D. M. Neilson; W/O. W. W. Spencer; W/O. T. K. Theaker.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—F/O. A. R. McCurdy.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. T. Bridger; F/O. H. N. Skelton; F/O. R. E. Williams.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. N. C. Dumont; Flt. Sgt. S. Lievense; Flt. Sgt. R. C. Orrock; Sgt. E. J. Post.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. S. K. McGuigan; F/O. J. M. Robertson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. G. P. Charlebois; Sgt. F. C. M. Robitaille.

DIED ON ACTIVE SERVICE.—F/O. W. A. Gunning.

Royal New Zealand Air Force

KILLED IN ACTION.—Act. F/O. A. E. Brown.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. F/O. R. J. Odgers.

MISSING.—F/O. J. K. Morrison; W/O. E. G. Silcock; F/O. A. R. T. Smith; W/O. F. R. Wilkinson.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. M. A. O'Connell.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—W/O. D. J. Edmiston.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—P/O. P. Chapple.

South African Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Lt. R. Briggs, D.F.C.; Lt. D. J. W. Compton; Lt. B. J. De Klerk; 2/Lt J. C. Hoyle; Lt. L. J. Leach; 2/Lt. S. W. Pienaar; W/O. D. G. Walker; W/O. D. C. R. Webster

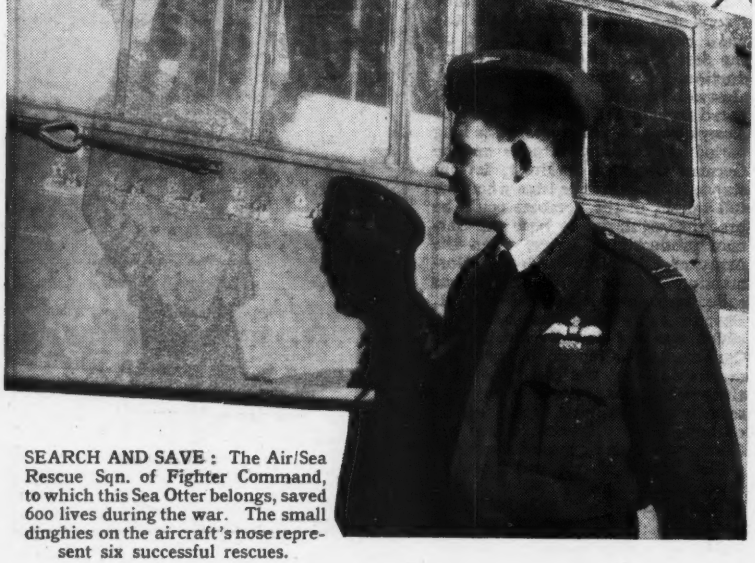
PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—2/Lt. W. R. Barrett; 2/Lt. D. J. Campbell; Lt. C. Davie; Lt. P. O. Dawber; W/O. R. Deitch; W/O. F. J. De Jonge; W/O. P. Detoit; Lt. H. Dutton; Lt. R. A. Evans; Lt. J. A. Ferreira; W/O. J. A. Floquet; Lt. J. H. Gater; Lt. J. Grobler; Lt. F. G. Hamilton; Lt J. R. Harmer; Lt. E. V. Hopping-Mills; 2/Lt. H. G. Janson; Lt. K. A. Kelley; Lt. A. M. Kenyon; Lt. D. Krynaux; Capt. M. McCardle; W/O. D. R. McCrindle; Lt. C. K. Mouton; W/O. G. J. Peens; W/O. J. L. Rodgers; Lt. C. H. I. Rood; Lt. R. R. W. Sutton; Lt. A. H. Swart; 2/Lt. P. D. Van der Berg; Lt. P. J. B. Van Dyk; Lt. P. J. Welman; 2/Lt. M. G. White.

WOUNDED OR INJURED IN ACTION.—Lt. J. M. G. Anderson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED,, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. R. Boraine; Lt. J. L. Caro; Air Mech. I. M. Dolby; Lt. D. S. Henderson; Lt. G. C. Pennington; Air Mech. V. C. J. P. Van Ryan.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—W/O. E. B. Chapman; W/O. K. G. Howard; 2/Lt. I. A. MacKenzie.

ADMIRAL'S FAREWELL : Admiral Harcourt, C.-in-C. Hong Kong, boarded his old flagship, the *Indomitable*, to say good-bye to the ship's company. He is seen here returning the guard of honour's salute on the flight deck of *Indomitable*.



SEARCH AND SAVE : The Air/Sea Rescue Sqn. of Fighter Command, to which this Sea Otter belongs, saved 600 lives during the war. The small dinghies on the aircraft's nose represent six successful rescues.